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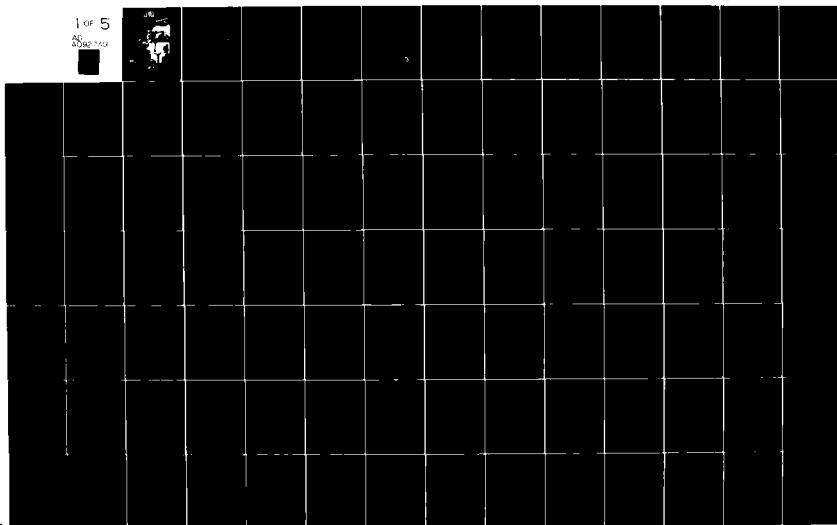
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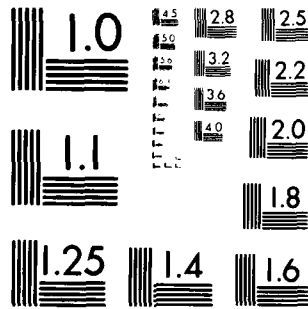
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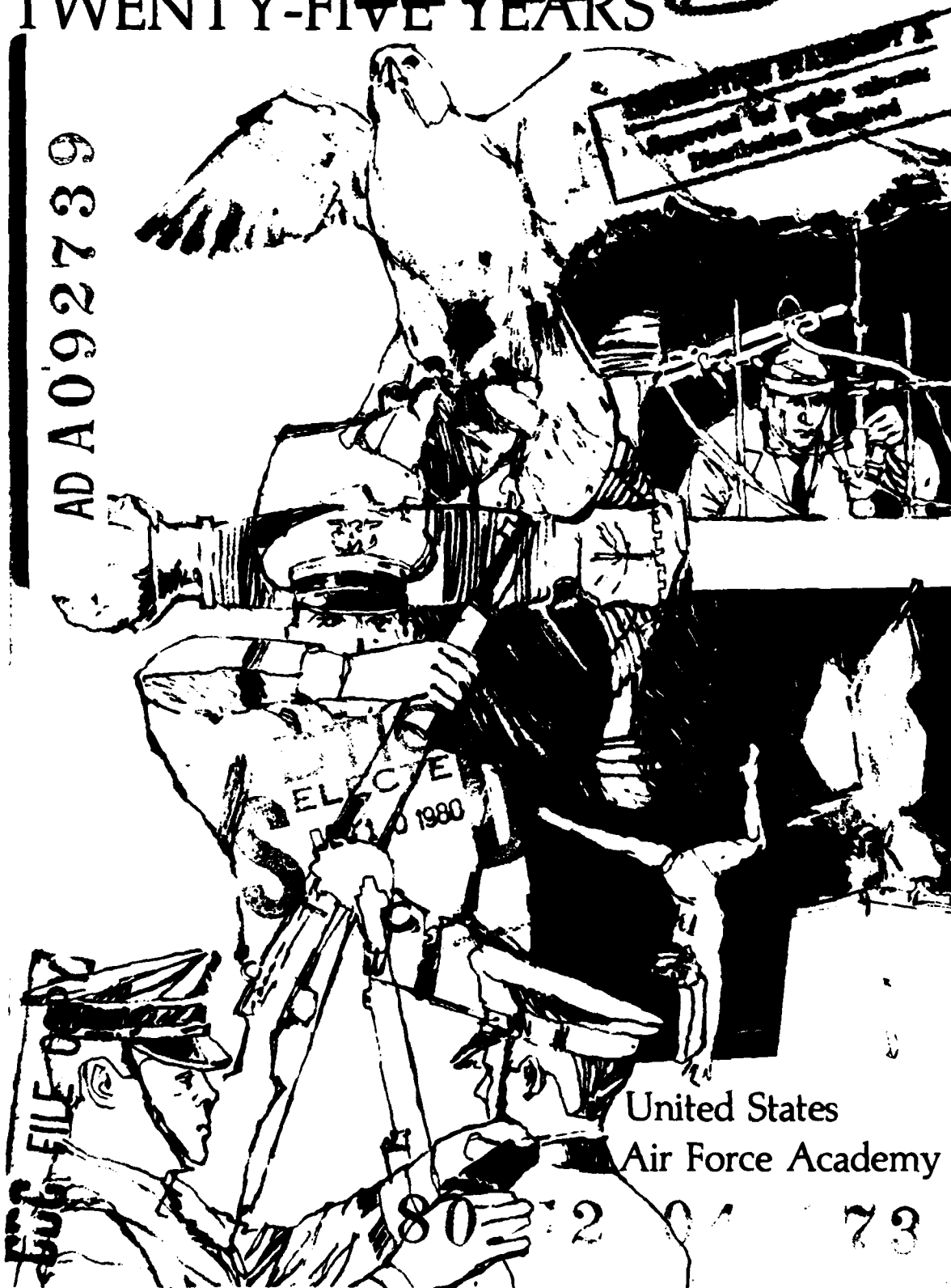




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**THE UNITED STATES AIR FORCE ACADEMY'S
FIRST TWENTY-FIVE YEARS**

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THE UNITED STATES AIR FORCE ACADEMY'S

FIRST TWENTY-FIVE YEARS

Some Perceptions .

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The Dean of the Faculty
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To
 Those who came before
 and
 For
 Those who will follow

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The opinions expressed in this volume are those of the individual authors and do not necessarily reflect the opinions of the faculty and staff of the United States Air Force Academy.

25TH ANNIVERSARY EDITORIAL COMMITTEE

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FOREWORD

Late in 1978, Brigadier General William A. Orth, Dean of the Faculty of the United States Air Force Academy, appointed a small committee to encourage the academic faculty to publish articles which could serve to call attention to the 25th Anniversary of the founding of the Academy. At our first meeting the committee members conceived the idea that, in addition to offering help and encouragement to individual faculty members in publishing scholarly articles, we might also solicit from each academic, military training, and athletic department essays on their individual perceptions of their past accomplishments and future plans in contributing to cadet education. This volume of essays is the result of their responses to our request.

In our letter to each contributing department, we encouraged "an introspective examination" of the department's first twenty-five years and a statement of "aspirations" or "philosophical ideals" which might give insight to the future faculty and staff. Beyond a few general suggestions regarding length and scope, we intentionally left each department free to express its own self-image in its own way, asking only that the self-assessments be "frank, open, and fair."

As we expected and as the reader will discover, the articles vary widely in scope, detail, and emphasis. Some offer detailed chronological, historical accounts of the department's evolution; some single out only major trends and changes in departmental curriculum. Some discuss individual contributions of departmental faculty; some emphasize the department's contributions to the Academy community and the Air Force at large; some deal chiefly with matters of educational philosophy. This variety of approaches is, we believe, one of the strengths of the volume as a whole and a potential source of value in years to come. Each essay

represents the authors' present perspective on the department of which they are now members. It is likely that the choices of emphasis, what to include and what to omit, will be interesting and illuminating, not only to the present generation of readers but to those in the future who bring an additional perspective of historical hindsight to their reading.

For readers who are not currently acquainted with the organization of the Academy's educational programs nor with some of the terminology peculiar to the Academy community, a brief review of these matters may be helpful. The cadet educational program at the Academy is administered by three separate "mission elements"—the Dean of the Faculty, who is primarily responsible for academic education; the Commandant of Cadets, who is primarily responsible for military studies and training; and the Director of Athletics, who is primarily responsible for physical education and intercollegiate sports. Historically, each of these mission elements has been nominally co-equal in responsibility for the total program of cadet education, although there have been variations in the share of the individual cadet's time which each mission element has controlled. The Table of Contents of this volume lists the present array of academic, military, and athletic departments, but it is noteworthy that these departmental assignments have not been constant during the Academy's history. Hence, articles on individual academic *disciplines* are grouped under the department which now has administrative jurisdiction over the discipline. Other administrative combinations of individual disciplines have often prevailed in earlier years; indeed, such seemingly odd marriages as philosophy and political science have at times reflected administrative expediency rather than academic logic. The individual essays will usually refer to and clarify the various combinations which have evolved over the past twenty-five years.

The first essay in this collection, "Origins of the United States Air Force Academy Curriculum," offers a broad over-

view of the initial steps in developing a curriculum. It also outlines briefly the major developments in moving from a totally prescribed curriculum, through a process of curriculum enrichment which offered a limited number of cadet options, to the present curriculum prescribing about two-thirds of the academic courses plus an academic major which may be freely chosen from a group of separate fields of specialization.

Change, not stability and tradition, has been a characteristic feature of cadet educational programs thus far in the Academy's history; it appears that the willingness to modify, to innovate, to seek more effective educational combinations and techniques is likely to remain alive in the future.

The 25th Anniversary Editorial Review Committee hopes that this volume will be a useful record of what the Academy has done, is doing, and aspires to do, a fitting if modest commemoration of the first twenty-five years of our efforts to educate cadets for leadership roles in the United States Air Force.

15 May 1979
USAF Academy, Colorado

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Introduction

ORIGINS OF THE UNITED STATES AIR FORCE ACADEMY CURRICULUM

Although the idea of an academy specifically to educate Air Force officers can be traced to the Billy Mitchell era and early debate over an independent air force, the first plans for an Air Force academy curriculum were not formulated until after the Air Force gained autonomy in 1947. The need for an Air Force academy was based upon the assumption that the special education of Air Force officers could not be provided by civilian universities or by the existing service academies. As explained by Dr. John A. Hannah in the congressional hearings on the bill which provided for the establishment of the academy, service academies "perform two unique services which no civilian institution of like rank could hope or be expected to do." First, the academies "with their intense and continued emphasis upon the ideal of service to the country" endeavor to motivate young men (and now young women) toward lifetime careers as officers in their respective services. Second, Dr. Hannah argued "that few professions, if any, can match the success of the service academies in inspiring their members to high standards of integrity and ethical conduct." He concluded therefore that it was "not only desirable but necessary that the Air Force should have its own Academy where it can teach its own cadets those same lessons."¹ Congress apparently agreed with Dr. Hannah and passed the Air Force Academy Bill which was approved as Public Law 325 by President Dwight D. Eisenhower on April 1, 1954.

Editors' note: This article was written by Major James P. Tate, former faculty member with the Department of History, and is used with his permission.

¹U.S. Congress, Senate Committee on Armed Forces, *Hearings on H.R. 5337, To Provide for the Establishment of a United States Air Force Academy*, 83d Congress, 2d Session, 1954, p. 5.

The initial curriculum offered at the Academy was the result of the thought, study, and recommendations of a wide range of distinguished educators, legislators, and officers of the Army, Navy, and Air Force. In developing the curriculum they faced three fundamental questions: (1) What should an Air Force Officer know? (2) What skills should he possess? (3) What curriculum would best provide that knowledge and those skills?² Beginning in early 1948, several Air Force boards and committees studied these questions and proposed curricula for the Academy. The most comprehensive curriculum plan was submitted by the Air Force Academy Planning Board, established in the fall of 1948 by the Air University and directed by the Air Force Chief of Staff, General Hoyt Vandenberg, to prepare plans for an Air Force Academy "based upon a four year course of instruction generally along the lines of the present service Academies."³ In line with these instructions the Planning Board determined that the Air Force Academy should "be an undergraduate institution conferring a B.S. degree upon those successfully completing the course of instruction," that the curriculum should "be designed to offer a broad general education as well as a sound background in aeronautical science and tactics," and that the Academy "should not provide specialized training in the technical duties of junior officers, since that is the responsibility of other Air Force commands."⁴

Within the Air Force Academy Planning Board, specific responsibility for developing a curriculum was assigned to the Curriculum Group, a committee of nine officers who in the

²Bernard Spiro, "Origin and Development of the United States Air Force Academy Curriculum," M.A. thesis, University of Maryland, 1960, p. 79.

³U.S. Department of the Air Force, Air Force Academy Planning Board, *Air Force Academy Planning Board Study: A Plan for an Air Force Academy*, I, iii.

⁴*Ibid.*, I, 5.

course of their work consulted and were assisted significantly by more than thirty of the nation's leading educators. The Planning Board began work with an attempt to define the ideal Air Force officer. After considerable deliberation they agreed that ideally the Air Force Academy would graduate an officer who would be the following:

- a. Well-grounded in Air Force principles, practices, and procedures.
- b. Broadly and soundly educated in the humanities, sciences, and military studies.
- c. Conscious of the mission and responsibility of the profession of arms.
- d. Devoted to his career and sensible of his obligation to his country and to his service.
- e. Motivated to work for the preservation of peace and willing to fight for its effective accomplishment.
- f. Instilled with a high sense of loyalty, duty, and subordination of his individual desires for the common good.
- g. Skilled in human relations and possessed of a knowledge of the world and its peoples.
- h. Respectful of the rights and liberties of individuals, institutions, and nations.
- i. A calm, effective, resourceful leader.
- j. Receptive to new ideas and learning.

k. A man who knows how to "win," and how to take his place on a winning team.

l. An honored representative of the Air Force.⁵

In short, an individual with the breadth, "regardless of his specialty, to represent the Air Force advantageously in any educated group, at home or abroad, socially or officially."⁶

With this definition of the ideal officer in mind, the Planning Board proposed a curriculum with a relatively even balance of course credits in humanities, sciences, and military studies. The Division of Humanities would offer sixty-six credit hours of courses in English, foreign languages, psychology, philosophy, geography, history, economics, government, international relations, and great issues. The purpose of those courses was "to provide the potential Air Force officer with a knowledge of the world about him, an understanding of the people in that world, and a skill in dealing with the people of that world."⁷ The Division of Sciences was "to provide a solid foundation of Basic and Aeronautical Sciences, to instill in the Air Force Cadet the basic principles of technical thought and analysis, and to train his mind to assimilate ideas, to formulate working hypotheses and to draw correct conclusions from given facts."⁸

To accomplish this objective the Division of Sciences was to offer seventy-six credit hours in mathematics, chemistry, engineering drawing, physics, applied mechanics, thermodynamics, electrical engineering, mechanics of materials, aerodynamics, and electronics. The Division of Military Studies was charged with preparing the cadet "mentally, psychologically, and physically for exercise of command and

⁵U.S. Department of the Air Force, Air Force Academy Planning Board, *Air Force Academy Planning Board Study: Curriculum*, II, vi.

⁶*Ibid.*, II, v.

⁷*Ibid.*, II, 2.

⁸*Ibid.*, II, 142.

the fulfillment of the responsibilities and duties which must be assumed upon graduation from the Air Force Academy."⁹ The Division of Military Studies would offer fifty-three credit hours of study in military orientation, tactics, military hygiene, physical education, national military establishment, military law, and administration.

In March, 1949, while the Air Force Academy Planning Board was preparing its final report, Secretary of Defense James Forrestal appointed the Service Academy Board to review the entire question of educating career officers for the Armed Forces. Popularly known as the Stearns-Eisenhower Board, after its chairman, Robert L. Stearns, President of the University of Colorado, and its vice-chairman, retired General Dwight D. Eisenhower, then President of Columbia University, the Board included the Presidents or Vice-Presidents of five other major universities, the Superintendents of the U.S. Military Academy and the U.S. Naval Academy, and advisory panels of distinguished educators for each major field of study. In its report, the Stearns-Eisenhower Board reaffirmed the need for the traditional academies at West Point and Annapolis and urged "that the Air Force Academy be established at the earliest possible date."¹⁰ The members of the Board and of its advisory panels on Science and Engineering, on Social Sciences, on Language and Area Studies, on Health and Physical Education, and on Military Education reviewed the Air Force Academy Planning Board's Report, approved of its findings, and agreed with its "generalist" definition of an ideal officer. In addition to confirming that "the future Regular Officers of the three Services should have abilities in leadership of modern warfare,"¹¹ the Service Academy Board declared that future

⁹Ibid., II, 216.

¹⁰U.S. Department of Defense, Service Academy Board, *A Report and Recommendation to the Secretary of Defense* (Washington: Government Printing Office, January, 1960), p. 6.

¹¹Ibid., p. 1.

career officers "should have a background of general knowledge similar to that possessed by the graduates of our leading universities. They must have a firm grasp on the particular role of the military establishment within the framework of our government and in a democratic society. They must be aware of the major problems of the nation which they are dedicated to serve, and understand the relationship between military preparedness and all other elements which are a part of the fabric of real national security."¹² They declared that the basic function of service academies was "to give general education, in an atmosphere of devotion to country and service, with emphasis on breadth of horizon necessary to comprehend scientific advances and social changes, and on cultural balance favorable to adaptability to change and appreciation of moral authority as an essential dimension of democracy in war and peace."¹³

The support of the Stearns-Eisenhower Board backed by the considerable prestige of its members virtually assured eventual establishment of the Air Force Academy and encouraged Air Force officials to accelerate their preparations. In December, 1949, almost simultaneously with the publication of the Service Academy Board Report, the Air Force assigned Lieutenant General Hubert R. Harmon as special assistant to the Chief of Staff for Air Force Academy matters with responsibility for all planning for the future academy. Using as starting points the Air Force Academy Planning Board's proposals and the recommendations of the Stearns-Eisenhower Board, General Harmon and a small planning staff headed by Colonel William S. Stone began final preparation of the initial Air Force Academy curriculum. The first major problem concerned pilot training. A recommendation that pilot training not be included in the cur-

¹²Ibid., p. 57.

¹³Ibid., p. 67.

riculum had been made in the summer of 1948 by a board headed by Vice-Chief of Staff, General Muir S. Fairchild.¹⁴ General Nathan F. Twining, then Chief of Staff, accepted this recommendation, but many people both in and out of the Air Force did not agree with the decision. Among those advocating pilot training was Congressman Carl Vinson, Chairman of the House Committee on Armed Services. In March 1949, Congressman Vinson told Secretary of the Air Force Stuart Symington that he would oppose an air academy without a flying training program. Secretary Symington agreed that the Academy should include some phase of flying training and passed the problem on through channels to General Harmon.¹⁵

General Harmon studied the advantages and disadvantages of flying training at the Academy and concluded that a complete pilot training program would interfere too much with the academic program. Argument continued over the kind and amount of flying until January 1953, when at the request of General Harmon, a board of five general officers was convened to settle the issue. The generals reviewed all sides of the issue and agreed "that the curriculum should include a concept of global indoctrination, that some pilot indoctrination be offered, and that cadets should be qualified and graduated as aircraft observers."¹⁶ Air Training Command prepared a program to meet those requirements, and it was integrated into the curriculum.*

¹⁴William T. Woodyard, "A Historical Study of the Development of the Academic Curriculum of the United States Air Force Academy," Ph.D. dissertation, University of Denver, 1965, p. 41.

¹⁵Spiro, p. 96.

¹⁶Spiro, pp. 98-9.

*In 1957 it was decided that the program as it had evolved would qualify graduates for navigator wings rather than those of an aircraft observer.

Meanwhile, the academic program had been refined by Colonel Stone's planning group and reviewed by leading civilian educators. The scientific courses were scrutinized by members of the faculties of Purdue University and Massachusetts Institute of Technology. The social sciences and humanities curriculum was reviewed by scholars at Stanford and Columbia Universities.

Thus, by the summer of 1954 the Air Force had an initial curriculum plan for the Air Force Academy. In accordance with the intentions of Congress in the Air Force Academy Act, the curriculum would qualify Air Force Academy graduates for a baccalaureate degree, and it was designed to:

offer a broad general education, and to provide a course of instruction, including flight and such related training as may be advisable, that will (1) equip graduates with the training, experience, and motivation that will prepare them to graduate with the knowledge, character, and qualities of leadership required of a junior officer, and (2) provide a basis for continued development of the graduates throughout a lifetime of service to their country, and preparedness for military responsibilities of the highest order.¹⁷

The initial curriculum was divided into two main programs, the academic program under the Dean of Faculty and the airmanship program under the direction of the Commandant of Cadets. The academic program included 63-2/3 credit hours in science and engineering and 74 credit hours in social sciences and humanities. The airmanship program in-

¹⁷U.S. Congress, Senate, *Report to Accompany H.R. 5337, To Provide for the Establishment of a United States Air Force Academy*. S. Report 1041, 83d Congress, 2d Session, 1954, p. 13.

cluded physical training, military training, and flying training for a total of 9-5/6 credit hours (it should be noted that the ratio of actual contact hours to course credits was much higher in the airmanship program than in the academic program).¹⁸

Although General Harmon, who had been appointed the first Superintendent of the Air Force Academy, considered the initial curriculum "about as good as could be devised," he requested in 1956 that the Chief of Staff, USAF, appoint a board of general officers to review the Academy program in order "to be as sure as it is possible to be" that the views of his staff were "in consonance with the best, informed opinion of the Air Force as a whole."¹⁹ This openness to review and constructive criticism of the Academy curriculum has been Academy policy throughout its history. In addition to reviews such as that requested by General Harmon, the Academy is subject to reviews at any time by the Department of Defense, the President, and the Congress, and to annual scrutiny by the Board of Visitors. Internally the Academy curriculum has been constantly reviewed and subject to adjustment by the Superintendent, the Dean of the Faculty, the Commandant of Cadets, the Academy Board, the Curriculum Committee, and the Faculty Council. Out of this process, individual courses have been added and deleted, adjustments have been made in the cadet workload, and in the balance between sciences and engineering on the one hand and social sciences and humanities on the other. Two major adjustments have been the Enrichment Program, initiated in 1957, and the Majors-for-All Program, initiated in 1964. The Enrichment Program allowed unusually talented cadets or those with previous college work to advance beyond the prescribed curriculum. A cadet could participate

¹⁸Spiro, p. 145.

¹⁹U.S. Air Force Academy, *Self-Survey Report, 1958*, p. 9.

in the Enrichment Program by validating a prescribed course, thus creating an opening in his schedule, by participating in accelerated courses, or by overloading. While it was not necessary for a cadet to choose a major to participate in the Enrichment Program, it was possible through participation in the program to earn the additional credits required for a major in either Basic Science, Applied Science, Public Affairs, or English. Participation in the program grew until in 1964 more than 50% of the graduating class had earned a major. The success of the Enrichment Program led to the establishment of the Majors-for-All Program. The change involved splitting the standard academic curriculum so that every cadet would have the opportunity to earn a major within the prescribed time of 146 semester hours. Both the Enrichment Program and the Majors-for-All Program preserved the core curriculum which ensured that every Academy graduate would receive a broad and general education.²⁰

As aptly put by Lieutenant General James E. Briggs, second Superintendent of the Air Force Academy, the Academy curriculum "is rooted in the best traditions of the past, taught in the context of the present, and continually reexamined in the light of the future needs of the Air Force."²¹ Throughout all of the adjustment and progress of thirty years of evolution, there has been a constant effort to maintain a sound and balanced curriculum oriented toward the Air Force Academy mission of providing "instruction, experience, and motivation to each cadet so that he will graduate with the knowledge and the qualities of leadership required of a junior officer in the United States Air Force, and with the basis for continued development throughout a lifetime of service to his country, leading to readiness for

²⁰"The Air Force Academy Pioneers Again," draft of a news release (USAF Library: Special Collections, 1964), pp. 1-5.

²¹Spiro, p. 124.

responsibilities as a future air commander."²² This effort has been endorsed by virtually all of the many boards, committees, and ad hoc groups which have scrutinized the Academy's curriculum.

²²United States Air Force Academy *Catalog*, 1959-1969.

THE ACADEMIC PROGRAM

Department of Chemistry and Biological Sciences

CHAPTER 1

THE EVOLUTION OF THE DISCIPLINE – 25 YEARS OF
CHEMISTRY AND BIOLOGICAL SCIENCES*

On 2 August 1954, the first Academy superintendent, Lieutenant General Hubert R. Harmon submitted to the Chief of Staff a list of the "principal staff positions" at the Air Force Academy and the names of the officers whom he wished to fill them. These key positions included the assistant dean and the professors of mathematics, engineering drawing, chemistry and physics, English, philosophy, history, and geography.¹ On 30 September 1954, Colonel James V. G. Wilson assumed the duties of Professor of Chemistry and Physics, and the history of the department officially began.

On 20 December 1954, Colonel Wilson submitted to the Dean of Faculty for approval the proposed objectives and a broad outline of the content of the general chemistry course.² The objectives of the course were as follows: "a. To train the cadet to think scientifically; b. To impart to the cadet information which is of professional value; c. To prepare the cadet for later technical and scientific courses; d. To impart to the cadet information which is of cultural value".³ Brigadier General Don Z. Zimmerman tentatively

*This chapter was prepared by Major Hans J. Mueh, Associate Professor of Chemistry.

¹Memo from Gen Harmon for C/S, USAF, subj: "Selection of Key Personnel," 2 August 54.

²Memo from Prof of Chem for DOF, subj: "Chemistry Course Content," 20 Dec 54.

³Ibid., Incl. 1, "Objectives of the Course in Chemistry."

approved the course outline of the Chemistry Department, but he felt that the mission and course objectives should be more detailed and made suggestions as to how that clarification could be done.⁴ The Chemistry Department prepared a new statement of the objectives and course content and submitted them to the Dean of Faculty who gave his approval on 9 March 1955.⁵

An important item in the Chemistry Department curriculum development was the designing and drafting of specifications for laboratory equipment. After several inspections of chemistry laboratories at civilian universities and consultations with manufacturers, a laboratory system was selected which even after twenty years is still being used to teach more than 1500 cadets each year. Recent changes in health and safety requirements may soon necessitate the expenditure of significant sums to update the lab system, a subject which is addressed below.

On 18 August 1955, Colonel Wilson was appointed Professor of Electrical Engineering and Electronics and Acting Professor of Physics. In turn, he was relieved from his duty as Professor of Chemistry, and this position was assumed by Lieutenant Colonel William T. Woodyard.

All of the Academy courses were originally designed to relate or support Air Force matters as closely as possible and to be integrated horizontally and vertically with other related fields. Toward this end, the Chemistry Department itself prepared the chemistry study guide problem book and the laboratory manual to meet the unique requirements of the Academy environment and stated course objectives. It became obvious very early in the Department's history that the range of abilities of students (many had prior college level

⁴Memo from DOF to Dept of Chem, subj: "Mission of Course and Objectives of Dept of Chemistry," 9 Mar 55.

⁵"History of Dept of Chem," 1 Mar 55 to 31 Mar 55.

chemistry before coming to the Academy) necessitated the establishment of an advanced level course. Therefore, a full year (second level) course, the first semester being primarily qualitative analysis and the second semester quantitative analysis, was designed for the academic year 1956-1957.⁶

Since chemistry is a scientific subject, all phases of the course were aimed at teaching the cadet to think scientifically and objectively. Therefore, the course was oriented to present the cadet with as many problem-solving situations as possible. The faculty members during these early years felt that the laboratory sessions, theoretical lessons, and those lessons concerned with significant figures and scientific method were the most valuable. They also felt that those sections dealing with nuclear chemistry and fuels had "exceptional professional value" in line with the original design to relate the courses to Air Force matters as closely as possible.⁷ This early emphasis on problem solving techniques has changed very little over the past twenty-five years and, in fact, those highly regarded sections of instruction on nuclear chemistry and fuels have currently taken a back seat to the ever increasing emphasis on scientific reasoning and logical problem solving.

The first department staff to implement those policies consisted of one professor (Lt Col Woodyard), one associate professor, three assistant professors, and three instructors. Five were rated and three were nonrated; all had college level teaching experience ranging from two to nine years.⁸ It was an excellent blend of officers with varied academic and military backgrounds.

⁶Memo from Prof of Chem to OIS, subj: "Supplement to History, Chemistry Department," n.d.

DF-AAFDF-3A, from Dept of Chem to Academy Historian, subj: "Information for Annual Historical Report," 29 Aug 56.

⁸"Hist of Chem Dept," 1955-56.

Dr. Harry H. Sisler, Head of the Department of Chemistry at the University of Florida, Gainesville, Florida, visited the Air Force Academy 27 through 29 January 1958. His primary function was to observe the chemistry program in relation to the general curriculum. He was favorably impressed and remarked that he thought the course was "well-planned and well organized . . . of college standard . . . and better organized than that in most American Chemical Society (ACS) accredited colleges, universities, and engineering schools which I have visited." He also "highly commended" the sectioning of the cadets in accordance with their abilities and background. Dr. Sisler did, however, criticize the general chemistry course because it provided "much less time for laboratory experience than is the case in the general chemistry courses in ACS accredited schools." He did believe that "the highly efficient organization of the course" made the deficiency "less serious," but he felt that the cadets' training in chemistry "would be appreciably improved by an increase in laboratory time."⁹

After many discussions with Air Force and civilian scientists, the department proposed in July 1957 that a course in physical chemistry be given as part of the Academy's enrichment program. It was generally agreed that a course in physical chemistry was "the most valuable chemistry course that could be given future Air Force officers." It was determined that perhaps five percent of the entering classes would qualify to take the course.¹⁰

Dr. Sisler expressed enthusiasm for the special courses offered by the Chemistry Department when he stated, "The Chemistry staff has taken a very imaginative step forward in chemical education in evaluating the background and abilities

⁹Unsigned, "Consulting Report on Visit with Dept of Chemistry, USAFA, Jan 27-29, 1958."

¹⁰DF, Draft of Chemistry to DOF, subj: "Proposed Course in Physical Chemistry," 19 Jul 57.

of entering cadets and placing those of superior qualifications directly into a course in analytical chemistry. . . and placing those of highly superior qualifications directly into a course in physical chemistry. The intellectual 'atmosphere' in these special courses is very fine . . . I believe that USAFA has by this program taken a position of leadership in an important phase of chemical education."¹¹ Although the curriculum has drastically changed over the years and cadets are no longer automatically placed in the advanced courses, the department continues to be a pioneer in the area of placement according to background and ability and now uses these ever-improving placement procedures to place cadets in one of three general chemistry courses. This subject will be addressed in more detail later.

In January 1958, Lt Col Ronald M. Howard, an Assistant Professor of Chemistry, proposed to the Curriculum Committee that the Academy institute a course in human biology. He believed that the following concepts supported the need for such a course:

- (1) The "biological factor" is the greatest problem standing in the way of space travel.
- (2) The probable Air Force role in space travel and space warfare makes it advisable to introduce all cadets to a basic course in biology.
- (3) The curriculum, as it exists, would not produce graduates who appreciate the biological factors problem.
- (4) One of the functions of undergraduate education is to expose the student to many separate disciplines, thus assisting him to find his field of interest.¹²

¹¹Unsigned, "Consulting Report on Visit with Dept of Chemistry, USAFA, Jan 27-29, 1958."

¹²Memo, Asst Prof of Chemistry to Curriculum Committee, subj: "Review of Proposed Curriculum," 8 Jan 58.

The proposal was favorably received and the proposed course, "Human Physiology," was described as follows:

A study of the principles of biological science as demonstrated by the human organism. The structure and dynamics of the human body with special emphasis on circulatory, respiratory and nervous systems and the effects of the conditions of high altitude and space on man.¹³

On 9 June 1958, the Academy Board and the Superintendent approved the inclusion of a course in human biology in the program of instruction at the Academy and gave responsibility for the course to the Department of Chemistry.¹⁴ That course signaled the beginning of an association of chemistry with physiology which, even through years of separation and priority changes, still exists today. During the academic year 1958-1959, the Department continued to upgrade and expand its program. Courses in theoretical chemistry and chemical research were proposed for offering during the 1959-1960 academic year as additions to the previously mentioned enrichment courses. The Department also cooperated with the other departments in the Division of Basic Sciences (Mathematics and Physics) on plans for a basic science major. The Faculty Council approved the plan which called for seventeen credit hours in selected courses beyond the required courses.¹⁵ It included an elective course in chemistry and laid the foundation for further expansion of the Department curriculum to give the cadet a broader range of courses from which to choose.

The Department of Chemistry taught an additional prescribed course, Chemistry 104, *Human Physiology*, during

¹³DF, Dept of Chemistry to DOF, subj: "Course in Human Physiology," 28 Jun 58.

¹⁴USAF History, 10 June 1957-11 June 1958.

¹⁵Dept of Chemistry, "Year End Report 1958-1959."

each of the two terms of the 1959-1960 academic year. Chemistry 101-102, *General Chemistry*, and Chemistry 200, *Human Biology*, continued as the other prescribed courses taught during this academic year. Chemistry 353, *Theoretical-Inorganic Chemistry*, was taught for the first time as an additional enrichment course. Two additional courses were approved as enrichment courses, Chemistry 451, *Space Physiology*, and Chemistry 351, *Chemical Reaction and Rates*. The latter course was to be part of the program leading to a Master of Science Degree in Astronautics. By 1 September 1959, the Department had an authorized strength of twenty-five officers although only nineteen were assigned.¹⁶ During the academic year 1960-1961, the Department officially changed its name to the Department of Chemistry and Physiology, Col William T. Woodyard continued to be the Department Head, and an accelerated general course (Chemistry 151) which covered an entire year's work in one semester was introduced as an alternative to Chem 101-102. That course was designed for cadets with prior chemistry instruction at the college level and essentially replaced the analytical and physical chemistry courses into which the upper ten percent of the previous entering classes had been placed. These courses were not taught during this AY 60-61, but the previously mentioned enrichment courses, Chemistry 353 and Chemistry 451, were taught.

It became apparent during the academic year 1961-1962 that the "official" department name was still up for debate since the name reverted back to just Department of Chemistry. During 1961-1962, Col Woodyard was on military sabbatical attending the Industrial College of the Armed Forces. During his absence, Lt Col Harrison E. Kee, Jr., served as acting department head. The Department continued to expand with the addition of a full-year sequence in organic chemistry lecture and introduction to organic lab.¹⁷

¹⁶Dept of Chemistry, "Year End Report 1958-1959."

¹⁷USAF History, 1961-1962.

In the academic year 1962-1963, Col Woodyard resumed his duties as Department Head and the department name was again "officially" listed as Department of Chemistry and Physiology, a title which would remain until the Department split during academic year 1968-1969. In 1962-1963, for the first time since 1959-1960, the Department taught a full-year sequence of physical chemistry courses, Chemistry 351-352. The most significant expansion of curriculum came in the area of physiology in part as a result of the desire of some cadets to go to medical school upon graduation. Courses in comparative anatomy (Physiology 360), vertebrate embryology (Biology 361), and general biology (Biology 362) were all taught for the first time.¹⁸ Physiology 451, physiology as applied to man in space, continued to be the only course of its kind taught in a service academy and was unique among civilian institutions as well.

By the start of academic year 1963-1964, there were fifteen chemists and eight physiologists in the department in addition to Col Woodyard. The only changes during this academic year were the establishment of separate courses to reach laboratory principles in organic chemistry, Chemistry 263-264, and the introduction of a chemical research course, Chemistry 474, which emphasized individual research and use of library facilities under the direction of a member of the faculty. All of these courses added to the ever expanding number of enrichment courses in the academic curriculum. The ever-increasing cadet interest in the life sciences with the advent of medical school training for regular Air Force officers prompted the Department to offer the biology courses on a special basis and to propose the establishment of an enrichment curriculum major in chemistry. The major was specifically recommended for students whose area of interest was chemistry of the life sciences. On 7 March 1964, the

¹⁸USAFA Catalog, 1963-1965.

Curriculum Committee approved a majors program in chemistry and on 27 March 1964 the Academy Board concurred with the Curriculum Committee.¹⁹

The academic year 1964-1965 was an important pivotal one for the Department of Chemistry and Physiology. During this period, the previously approved chemistry major was initiated; the first students to graduate with the major would be members of the Class of 1966. (American Chemical Society accreditation for the major was granted early in 1967). From the very beginning, the chemistry major was designed to have "at least the quality and content prescribed by the Committee on Professional Training of the American Chemical Society."²⁰ The major was partly based on the Academy's core curriculum and the Basic Sciences Major, but there were several significant requirements by the American Chemical Society such as one year courses in organic and physical chemistry, semester courses in analytical and inorganic chemistry, a year of advanced work, 180 laboratory hours in organic chemistry beyond the introductory course lab total, and an additional 225 laboratory hours in analytical, physical, inorganic and/or advanced chemistry.²¹ In support of these requirements, the Department offered four courses for the first time: Chemistry 241, *Physical Chemistry I Lab*; Chemistry 242, *Physical Chemistry II Lab*; and Chemistry 333, *Instrumental Analysis*; were established to meet the 225 hour requirement for advanced lab; Chemistry 434, *Biochemistry*, was introduced to expand the options for the advanced work requirement. In addition, two new courses were proposed and developed for the 1965-1966 academic year: Chemistry 432, *Systematic Inorganic Chemistry*, would stress application of the established Theo-

¹⁹USAFA History, June 1963-June 1964.

²⁰Department of Chemistry and Physiology, "Year End Report, Academic Year 1964-1965," n.d. (Doc-DF-11).

²¹Ibid.

retical Inorganic Chemistry course; Chemistry 433, *Advanced Organic Chemistry*, would expand on the principles of organic chemistry.²² Academic year 1964-1965 was a truly pivotal one and established a standard of excellence, internally demanded and externally required, which continues to direct the Department's policies today.

During academic year 1965-1966, Col William T. Woodyard, Professor and Head, departed on a two year sabbatical leave as the Chief Scientist of the European Office of Aerospace Research in Brussels, Belgium. In his absence, Col Robert H. Brundin became Professor and Acting Head of the Department. On 30 June 1966, Col Brundin retired and Lt Col Charles K. Arpke assumed the position of Professor and Acting Head until Col Woodyard's return. Another action which was to prove significant was the 15 June 1967 appointment of Lt Col Peter B. Carter as Permanent Professor of Life Science.²³ During this academic year, Chemistry 222, *Analytical Chemistry*, was added to the curriculum as a course "designed to teach classical and modern analytical techniques" to chemistry majors who had not taken Chemistry 101-102 or who had taken Chemistry 151. It was also included as one of the three chemistry course sequences required of a basic science major.²⁴ The two previously developed courses in advanced chemistry, Systematic Inorganic Chemistry and Advanced Organic Chemistry were both taught for the first time and a new advanced course, Advance Physical Chemistry (Chemistry 435) was also added. In physiology, the Department continued to expand its offerings of "enrichment courses desired but not required for the pre-medical program" by offering new courses in *Independent Study*, Biology 499, and *Radiation Biology*, Biology 365.²⁵

²²Ibid.

²³Department of Chemistry and Physiology, "Year End Report of Activities, 1 Jul 67-30 Jun 68."

²⁴Ibid.

²⁵Ibid.

The academic year 1967-1968 proved to be another pivotal one for the Department of Chemistry and Physiology. Effective with the next academic year, the Department would be split into the Department of Chemistry and the Department of Life Sciences. Col Woodyard returned as Professor and Head of the Department but served as Vice Dean during this historical year; consequently, Lt Col Arpke continued to serve as Acting Department Head. No new chemistry courses were introduced during this year, but the Physiology branch was very active. The life science major was approved in November 1967, even before the formal activation of the Department of Life Sciences on 15 July 1968, and several new courses were added to support the new major. Courses in *Modern Biological Concepts* (Life Sci 260), *Genetics* (Life Sci 363) and *Bioengineering* (Science 452—an interdisciplinary course taught in conjunction with the Department of Electrical Engineering) were all taught for the first time.²⁶

During the next academic year, 1968-1969, Col Woodyard was appointed Dean of the Faculty, and Lt Col Alfred D. Norton was Associate Professor and Acting Head of the Department of Chemistry. The increasing size of the entering classes produced increasing disparity of academic backgrounds. This fact prompted the Department to introduce an intermediate level introductory chemistry course (Chemistry 121-122) during this academic year. This course was designed as a one year course to fill the gap between the Chemistry 151 (one-semester accelerated) course and the students with little or no chemical education background who were required to take Chemistry 101-102. The only other activity occurred in the area of physical chemistry,

²⁶Dept of Chemistry and Physiology, "Year-End Report of Activities, 1 Jul 67-30 Jun 68."

where the right sequence of lecture and lab courses was still being sought.²⁷

In the newly established Department of Life Sciences, under Colonel Peter B. Carter as Department Head, several new courses were added as required courses for those cadets desiring to be recommended for advanced medical training. The new courses offered included Life Sci 263 (*Introduction to Life Science*), Life Sci 431-432 (*Microbiology I & II*), and Life Sci 461-462 (*Developmental Anatomy I & II*).²⁸

Lt Col John R. Comerford, Jr. was Professor and Acting Head of the Department of Chemistry for academic year 1969-1970. Lt Col Robert W. Lamb, Associate Professor and Deputy Head, was selected to become Permanent Professor of Chemistry for the next academic year. No new courses were introduced or taught by either the Department of Chemistry or the Department of Life Sciences during this academic year.²⁹

From 2 July to 28 October 1970, Lt Col James S. Knox, Associate Professor, served as Acting Head of the Department of Chemistry. On 28 October, Colonel Robert W. Lamb returned from temporary duty in Southeast Asia and assumed the position of Department Head. A new curriculum change during this period was the introduction of a course entitled, *Pollution of Man's Environment*, ecological problem of pollution. In addition, a special topics course, Chemistry 495, was introduced to support the special interests of chemistry majors.³⁰ The topic continues to be selected by vote of the cadet chemistry majors.

The Department of Life Sciences continued to expand during this time frame with the introduction of several new courses. Courses in *Ergonomics* (Life Sci 352), *Bio-Organic*

²⁷Dept of Chemistry, "Year-End Report, 1 July 1968-30 June 1969."

²⁸Ibid.

²⁹USAF History, June 1969-June 1970.

³⁰Department of Chemistry, "Year-End Report of Activities, 1970-1971."

Processes of Life (Life Sci 371-372), *Molecular Biology* (Life Sci 460), and *Functional Anatomy* (Life Sci 465-466) were all taught for the first time in support of the expanding interest in advanced medical training. The Department of Life Sciences also contributed its own course to support the increased interest in pollution of the environment, *The Fundamentals of Econogy* (Life Sci 280).³¹

The Department of Chemistry continued to solidify its majors program during the 1971-1972 academic year. There were no new courses introduced during this period. On 1 July 1971, the new Department of Life and Behavioral Sciences was formed by the merger of the Department of Life Sciences and the Department of Psychology and Leadership with Col Peter B. Carter as Permanent Professor and Head of the new department. The Life Science major offered two tracks, a pre-medical track and a non pre-medical track, but the previously established department curriculum remained unchanged.³²

During the next academic year, 1972-1973, the Department of Chemistry made no course changes. Twelve members of the Class of 1973 graduated with chemistry majors; by this time a trend appeared to have been established—the number of graduating chemistry majors could be expected to consistently number between ten and fifteen cadets.³³ The Department of Life and Behavioral Sciences continued to expand from fifty-two to fifty-nine personnel authorizations. Most of the curriculum changes involved integrating, combining, and refining existing courses rather than adding totally new courses.³⁴

³¹Department of Life Science, "Year-End Report of Activities, 1970-71."

³²Department of Life and Behavioral Sciences, "Yearly Activity Report, 1971-72."

³³Dept of Chemistry, "Year-End Report, 1972-1973."

³⁴Dept of Life and Behavioral Sciences, "Year-End Report, 1972-1973."

No significant curriculum changes occurred in the Department of Chemistry during the academic year 1973-1974.³⁵ In the Department of Life and Behavioral Sciences, this academic year was characterized by stability and refinement of programs rather than growth in numbers of students. During this time period, the life sciences major premed track allowed up to three percent of the graduating class the opportunity to enter medical school for Air Force sponsored training. This number had swelled to twenty-five members of the Class of 1974.³⁶

The Department of Life and Behavioral Sciences continued to refine its courses without changing its curriculum during the academic year 1974-1975. On 19 August 1974, Col John W. Williams, Jr., Tenure Associate Professor and Deputy Head for Behavioral Sciences, was appointed Acting Head of the Department. The Department continued to sponsor both premed and nonpremed tracks during this period and as of 9 April 1975 the life science major had 219 cadets enrolled. However, the demise of the Cooperative Graduate Program* in medicine in 1975 produced significant changes in the life science curriculum, changes which were approved by the Academy Board and phased in as the Class of 1978 began taking their major courses in the spring of 1976. The pre-medical education program at service academies terminated

³⁵Department of Chemistry, "Annual Historical Report, 1973-1974."

³⁶Department of Life and Behavioral Sciences, "Annual Historical Report, 1973-1974."

**Editors' Note:* Begun in 1963, the Cooperative Graduate Program (CGP) allowed selected cadets to fulfill partial requirements at USAFA for a Master's degree from predesignated universities: Georgetown (economics and political science), Purdue (engineering), UCLA (management), and North Carolina State (mathematics). Upon graduation from USAFA, those cadets completed in residence at the respective universities their master's programs. During its twelve years in existence, the CGP expanded to include fifteen civilian universities in almost that many different disciplines.

with the Class of 1977, and the Department initiated steps to eliminate strictly premed courses from the program. The curriculum showed enough flexibility to adjust to the requirements of the cadet interested in preparing for a career in medicine at a later time in his career.³⁷

The academic year 1975-1976 began as a year of tremendous changes. The Department of Life and Behavioral Sciences was split, the Life Sciences Branch was recombined with the Department of Chemistry, and on 1 July 1975 the new department was given the title it had not had since 1968, the Department of Chemistry and Physiology, with Col Robert Lamb as Permanent Professor and Department Head.³⁸ On 1 January 1976, the department was redesignated Department of Chemistry and Biological Sciences. Another development during this time period which had significant impact on the administration of courses, although there was little impact on the content, was the introduction of a new Academy evaluation policy. As of 1 August 1976, each course in chemistry and biological science began utilizing four significantly different exams for morning and afternoon sections to maintain academic security and to decrease the possibility of cadet honor violations during exam periods.³⁹ In addition, General Woodyard announced a policy which would "ensure that all written homework other than themes, term papers, and term projects is ungraded; because it is ungraded, cadets may study together and use any source material."⁴⁰ In April 1976, the Chemistry Division received an accreditation visit from the ACS. As a result the division's ACS accreditation was continued in-

³⁷History of the USAF Academy, 1 July 1974-30 June 1975.

³⁸Dept of Chemistry and Physiology, "Annual Historical Report, 1 July-31 December 1975."

³⁹Dept of Chemistry and Biological Sciences, "Annual Historical Report, 1 Jan-31 Dec 76."

⁴⁰Faculty Operating Instructions 553-1, "Academic Practices and Procedures" 29 Oct 76.

definitely, but the concern expressed many years earlier by Dr. Sisler about the low number of laboratory hours was voiced again.⁴¹ Fortunately, the high efficiency of the laboratory courses offered more than compensated for the shortage of hours. Finally, a significant first occurred during the academic year 1975-1976. Dr. Andrew G. De Rocco, who held a Distinguished Chair in the Mathematical, Physical Science, and Engineering Division as a Professor of Molecular Physics at the University of Maryland and has recently accepted a position as Dean of the Faculty at Trinity College, served in the Department as one of the first two civilian Distinguished Visiting Professors at the Academy and contributed greatly to the immediate success of the program.⁴² The Department benefitted from this program again in the next academic year in the person of Dr. Thomas J. Muzik, Washington State University, who taught in the Biological Sciences Branch of the Department.⁴³

During the calendar year 1977, the Department made some important changes in both curriculum and administration. The most important change was the reorganization of the biological sciences program to eliminate the pre-medical major. The Life Science Branch eliminated several premed courses and introduced several new courses to support the cadet's natural talents, interests, and abilities. Special interest tracks in general biology, human performance, bioenvironmental sciences (ecology), and graduate school were established and are being enthusiastically pursued by the cadets.⁴⁴ The Chemistry Branch developed plans

⁴¹Dept of Chemistry and Biological Sciences, "Annual Historical Report, 1 Jan-31 Dec 76."

⁴²Dept of Chemistry and Physiology, "Annual Historical Report, 1 July-31 December 1975."

⁴³Dept of Chemistry and Biological Science, "Annual Historical Report, 1 Jan-31 Dec 76."

⁴⁴*Curriculum Handbook*, USAF Academy, 1978-1979.

for the reorganization of the branch into three new divisions under the deputy head: organic chemistry, inorganic and basic chemistry, and physical chemistry. This plan was implemented in 1978.⁴⁵

One additional change of significance occurred in 1978. The Chemistry Division, in response to a cutback in the amount of time available to the cadets to take majors courses, proposed an alternative track in chemistry to the Curriculum Committee, the General Chemistry Track. The ACS accredited major in chemistry had been pared to the absolute minimal ACS requirement without loss of accreditation, but the average cadet is now required to overload a course in at least one semester to complete the ACS major. The new track has wider flexibility, allows a later major declaration time, is useful for meeting graduate school (especially medical school) entrance requirements, and still fulfills the desires of cadets with wide interests in chemistry. In October 1978, the new General Chemistry Track was approved.

Over the next twenty-five years, the Department will probably undergo as many changes as have occurred during the past twenty-five. There are several areas of current interest receiving extra attention for future planning and curriculum improvement. For example, the subject of cadet placement based on academic background and skills has been an area of high emphasis for the past twenty-five years, but even now the subject is being reexamined. During the early years of the Academy, cadets were sectioned into general and advanced level courses based on the performance on a standardized exam plus prior academic achievement. Later, after several years of background and experience, placement was accomplished by a combination of the cadet's academic

⁴⁵Department of Chemistry and Biological Sciences, "Annual Historical Report, 1 Jan-31 Dec 77."

composite score and the ACS exam score. Still later, the Department compiled its own placement examination and last year a more sophisticated approach was employed using the Department's placement exam in conjunction with several selected cadet entrance parameters. The results were so encouraging that the approach will be used with varying parameters in an attempt to perfect the placement procedures. Since approximately 1500 cadets each year are exposed to some general chemistry course, perfecting the placement of cadets into the correct introductory course is a high priority item and would allow each introductory course to be taught at the highest possible level.

Another source of significant impact on the Department mission has come as a result of increasingly stringent environmental health and safety standards imposed by the Occupational Safety and Health Administration (OSHA). Consequently, the department laboratory facilities require upgrading at major expense, but the greatest impact is on the laboratory experiments since each must be examined for compliance with OSHA standards.

The Department has developed an active and productive research program, and through the years faculty investigators have distinguished themselves in their specialties, in the Air Force, and internationally. Research in a wide variety of subject areas such as streptococcal epidemic studies at the Air Force Academy, alternate battery power source development energetic materials, chemical lasers, and storage and destruction of Herbicide Orange for the Air Force not only supports the needs of the Air Force but also allows, by involving cadets in the independent study programs with individual research, the students to progress professionally, scientifically, and culturally. The Department is also actively involved in the Department of Energy sponsored project, Citizens' Workshop on Energy and the Environment.

The objectives of the Department of Chemistry first presented twenty-five years ago by Colonel Wilson have changed

very little and still represent the operating guidelines of the Department. Courses will continue to be developed to provide current, in-depth knowledge; to challenge curiosity; and to direct specific interests toward real Air Force situations. The methods may have become more sophisticated, as exemplified by the increasing use of computerized and audio-visual teaching aids as well as expanding research efforts, but the objectives —

- (a) to train the cadet to think scientifically (and logically),
- (b) to impart to the cadet information which is of professional value,
- (c) To prepare the cadet for later technical and scientific courses, and
- (d) to impart to the cadet information which is of cultural value,

and ultimately to produce well-rounded Air Force officers — will remain unchanged.

Department of Mathematical Sciences

CHAPTER 2

**FROM SLIDE RULE TO PROGRAMMABLE
CALCULATOR:
THE FIRST TWENTY-FIVE YEARS***

Introduction

In 1955 when the fledgling Air Force Academy began educating cadets of the Class of 1959, the Department of Mathematics was, in many ways, indistinguishable from her mother organization, the Department of Mathematics of the US Military Academy at West Point. The daughter matured quickly, however, and from the beginning she stretched her wings of independence and set a course toward future years of tradition that would be uniquely her own.

The traditions formed during the first twenty-five years of the Air Force Academy Mathematics Department would prove to be a unique blend of military heritage and youthful flexibility that could accommodate a varied faculty and student body as well as adjust curricula and teaching methods to the demands of an ever-changing world.

The Math Faculty

The varied military and academic backgrounds of the math faculty have been evident since the formation of the Depart-

*Colonel Lawrence G. Campbell (USAF, Ret.), Lieutenant Colonel William T. Hodson, III, Lieutenant Colonel Paul G. Ruud, Lieutenant Colonel Jay D. Sherman, and Captain Russell J. Webster—formerly and currently of the math department—compiled this chapter.

ment. The "whole man" theory, which is true to military tradition, has always driven the instructor recruiting program in the Department. At the organizational level, a balance has been sought in faculty members' academic disciplines, sources of commission and education, Air Force training and experience, and length and timing of assignments. At the individual officer level, a prospective instructor could be a mathematician, an engineer, a statistician, or a physicist. He could be an Academy graduate or not, he could possess a masters or a PhD degree, and his primary Air Force duty could be as a pilot, a navigator, an analyst, a computer technician or whatever.

The first faculty, who possessed this varied flavor of background, perhaps made the most significant contribution in the first 25 years. Being placed in the role of "creators," they rose to the challenge and in so doing set in motion much of what continues today as the policy and philosophy of the Department of Mathematical Sciences. Because of their position as the first math faculty, more detail on this group of nine officers is offered.

The first Department Chairman was Col Archie Higdon, a nationally recognized figure in the field of Engineering Mechanics. Also one of the original nine faculty members, the second Chairman was Lt Col John Ault, who had been a college instructor of mathematics and had done mathematical work in the Air Force following World War II. Lt Col John Querry had a PhD in mathematics from the University of Iowa, and Lt Col Jean Hempstead had an engineering degree and had taught engineering at Iowa State and at the Naval Academy. Maj Jacob Blackburn held a PhD in mathematics, while Maj Bill Fuchs held an engineering degree and had taught engineering at West Point. Capt L.G. Campbell had taught mathematics at two teachers' colleges and at the Naval Academy, and Capt Stewart Young was the only service academy graduate with a later engineering degree from AFIT. Capt Bill Marsland graduated from a teachers

college and had had previous Air Force analytical experience. Three of the nine original instructors held aeronautical ratings, and eight were World War II veterans. From this nucleus have grown the Departments of today and tomorrow. There is every indication that any AFA math faculty at any time will be an emulation of this early model. As an example, close to 30% of the present math faculty hold PhD's, and we have always tried to maintain the same percentage of rated instructors as nonrated.

One way of achieving that desired level of experience and balance of abilities is through the tenure program although its use in the Department has varied over the years. Although by 1967 there were three tenured professors who were also branch chiefs, there have been periods of no tenured officers. The Department now has five tenured professors who are among the ranking officers in the Department, which appears to be an optimistic posture for benefiting from experience in the implementation of policy. Used to their best advantage, tenured instructors have helped provide a necessary continuity of leadership for the Department through the years.

In 1976, the Air Force Academy originated a program of appointing civilian Distinguished Visiting Professors (DVPs) to academic departments to meet the need for civilian interaction with cadets and faculty for broadening, stimulation, and evaluation. The Math Department appointed its first DVP in 1978.

The AFA of today remains committed to a predominantly military faculty as a means of providing a role model of the professional officer with varying specialties, and with a solidarity of commitment to and pursuit of excellence in every endeavor. This pursuit has manifested itself in the accomplishments of many former Math Department instructors who, after a tour at the Academy, re-entered the mainstream of Air Force life to high ranking military and civilian positions.

The Student Body

Just as the math faculty has presented a varied composite picture throughout the years, so, too, has the student body. Since the beginning, cadets have come to the Academy with varied backgrounds, changing needs, and increasing accomplishments.

Cadets come to the Academy with personal histories that are diverse in every respect: economic, ethnic, and educational. This is clearly manifested by the broad spectrum of mathematical talent and experience that incoming cadets bring with them. Since the opening of the Academy, this diversity has been recognized and has been a primary factor in modeling the Department's approach to placing the new cadet at the right point in the required sequence of courses. Whereas, in the earlier days, some entering cadets (usually those with prior college) had been exposed to calculus, today many students have this same opportunity available in their high school curricula. The Department has had to be flexible enough to handle not only these accelerated students, but also those not ready to enter the normal curriculum sequence.

The answer to this problem has been a comprehensive program of testing, placement, and validation. For many years, the Department has administered a battery of placement tests to the new "Doolies" a few days after their arrival at the Academy, with all new cadets taking algebra and trigonometry tests. These tests are crucially important since their results determine whether an individual is enrolled in a refresher algebra and trigonometry course or proceeds directly into the calculus curriculum. Incoming students with calculus experience are given a series of three tests to determine their best starting point.

The need for a remedial math course probably has several causes, among which may be the atrophy of skills in students who have taken algebra early in their high school careers, poor high school curricula, and the "new math" movement of

the 1960's which stressed concepts at the cost of skills. A basic problem the Department faces is that an individual can satisfy Academy entrance exam requirements without seeming to possess the basic algebraic skills to succeed in the nonremedial portion of the math curriculum.

In response to their varied mathematical abilities, 25% of the original class were permitted to take an accelerated mathematics program. By the end of the first five years, more than half the entering cadets were placed in an accelerated curriculum which accomplished the two-year mathematics sequence of courses in a single year. A smaller number finished the program in one semester, and six cadets were granted transfer credit and were required to take no math courses at the Academy.

As an early experiment, three different levels of difficulty of mathematics courses, called "tracks," were offered to entering cadets. Some entered the "Enrichment Program," as it was then called, which enabled them to take courses in differential equations within the required curriculum. From 1960 to 1965, the three-track system was replaced with a two-track system and then in 1965, the three-track approach was tried again to provide for cadets of differing ability, although at times it seemed that the only difference between any two adjacent tracks was the pace of the course, the more advanced tracks covering essentially the same material, but at a faster rate than the regular track.

In 1970, the three-track system was abandoned in favor of a one-track system in which cadets with different math abilities were placed into the track at different positions, with the cadets who needed remediation having to take algebra and trigonometry to catch up with their peers. Another modification of the math curriculum occurred in 1977 with the institution of "honors" sections of most of the core courses. These honors sections contained the best math students and stressed more breadth and more depth than the regular sections of a course.

Through the years, cadets have required a flexible mathematics curriculum that keeps pace with the changing world around them. Traditionally, the Academy core curriculum has sought to present a body of knowledge that is the optimal mix of the arts and sciences that will help an individual to become a successful officer. For example, an orderly approach to problem solving has long been a major emphasis in the traditional math courses. As the Air Force has grown, however, it has become one of the world's largest users of applied technology. Thus, a knowledge of mathematics, the language of science and engineering, has become crucial to the cadet, particularly as it applies to the modern technological problems that future officers will face.

A more immediate need is for math courses that will be used in the cadets' further studies at the Academy. Since majors in physics, chemistry, aeronautics, astronautics, mechanics and electrical and civil engineering need more mathematics prerequisites than are available in the core, a large requirement arises for the Department to service those cadets needing advanced math training. As early as 1958, the Department of Aerodynamics listed completion of the advanced calculus course as a prerequisite for its course in theoretical aerodynamics. Beginning the same year, differential equations was a prerequisite for two advanced courses in the Electrical Engineering Department.

In the catalog course offerings for 1975-76, prerequisites for mathematics courses were indicated for twenty-eight different courses in twelve different departments. Those requirements are in addition to the core math curriculum courses.

The fact that mathematics exists in the curriculum largely to serve other departments may be seen in the nature, even the titles, of many of the courses. Titles such as Applied Mathematics, Applied Differential Equations, Advanced Engineering Mathematics, all taught by the Department, are obviously intended for use by other disciplines. Along the

same line, in recent years the Department has changed emphasis from a theoretical mathematics stance to a more applied one which was reflected in the changing of its name in 1973 from the "Department of Mathematics" to the "Department of Mathematical Sciences."

In addition to acting as a service department to support other disciplines, the Math Department continues to accommodate a more parochial need through course offerings that are given primarily for cadets in the mathematics and operations research majors.

While the Department has dealt with a great variety in cadet backgrounds as well as with changing cadet needs, one common thread seems to be the success of her graduates. The Academy as a whole is justifiably proud of the many accomplishments of its graduates, from their performance in academia to their performance in battle. The Math Department in particular may point with pride to the twenty Rhodes Scholars, two of whom were math majors, as well as to the eleven math and engineering sciences majors of the forty National Science Foundation Fellowship winners. One measurement of our service to graduates as a whole are the Graduate Record Exam (GRE) quantitative (mathematics) scores which, since 1964, have averaged in the 89th percentile.

The Curriculum

Perhaps a large part of the success of her graduates may be attributed to the Math Department's curriculum, which from the very beginning has been constantly revised and improved to reflect changing needs.

Since the Academy's inception, mathematics has occupied more cadet class time than any other required subject. During the first year, 1955-1956, all cadets were given a pre-calculus course consisting of algebra, trigonometry, coordinate

geometry, and, for the better prepared or more able students, short courses in vector analysis, mathematics of finance, and statistics. Upon a reappraisal of cadet abilities and in response to the needs of other subjects, calculus was introduced into the fourth class curriculum in the following year, where it has remained.

Although course numbers have changed and semester hours have been modified, fluctuating from 9 to 13½ semester hours required during the fourth class year, the subject matter has remained somewhat constant: calculus continues to comprise the largest bulk of the fundamental mathematics sequence. After a long period of gradual but steady change, we have moved from a program of no calculus during the fourth class year to a sequence that provides pre-calculus mathematics to approximately 20% of the entering cadets, who require remedial work in algebra and trigonometry.

Throughout its history, the Department of Mathematical Sciences has provided the opportunity for some failing cadets to repeat courses, sometimes during the summer months, but more frequently in the semester following the failure. The present system of short (one-half semester) courses simplifies the repeat course procedure since the failing cadet will be only a few weeks behind his classmates. Also, flunking a short course with fewer credit hours has a smaller negative impact on the cadet's cumulative grade point average (GPA).

In contrast to the mathematical offerings of other institutions, statistics has been a part of the required mathematics program since the earliest days of the Academy. The offering has varied in its nature, sometimes as a unit within one of the required courses and sometimes as a separate course. Nevertheless, the application of statistics to current Air Force topics was stressed from the very beginning, when the subject was taught from a set of notes written by members of the Department.

Several technological advances influenced the mathematics curriculum at the Academy. Early in the post-war period, the computer emerged as an important innovation. Since much of the early development of computers was done by mathematicians, it was natural that instruction in computer use should be done by departments of mathematics. Thus, in 1957 a course titled "Introduction to Machine Computation" was taught to eight cadets, followed in later years by courses in computer programming and numerical analysis. In 1965, the programming courses were transferred to the Department of Astronautics and Computer Science, where they have remained.

As another example of changing technology, the slide rule was used by all math students until 1975, but now has been totally replaced, as it has in most colleges and engineering schools, by the electronic handheld calculator.

The mathematics major developed early at the AFA. In 1959 transfer credit was first granted, and cadets were then permitted to validate mathematics courses, spending the time saved on more advanced work or on courses in other disciplines. Meanwhile the number of courses beyond the required core multiplied, and cadets specialized in their academic preferences. In 1961, four divisional majors were available to cadets: Basic Science, Engineering Science, Public Policy, and Humanities. Statistics and differential equations were required in the Basic Sciences major; and differential equations and vector analysis were required mathematics courses in Engineering Sciences.

By 1963, although only division majors were offered, Engineering Sciences majors were required to complete the course in digital computer programming, then taught by the Department of Mathematics.

The requirement for each cadet to specialize by completing an academic major was instituted in 1964. Mathematics was one of the subjects in which cadets could complete a major without taking enrichment or overload

courses. The number of mathematics courses had been increasing gradually to meet the demands of other disciplines, and very few additions needed to be made to round out a full major. Courses in differential equations and advanced engineering mathematics were already in the curriculum; additional courses in modern algebra, advanced calculus, probability, and complex variables completed a program for the undergraduate mathematics major. Since mathematics was one of few majors within the prescribed curriculum, many cadets chose it. In 1965 there were 200 cadets majoring in mathematics, and 34 members of the Class of 1966 graduated with a major in mathematics.

In subsequent years, the number of mathematics majors dwindled, perhaps because more alternatives were presented; at the present time about thirty-six cadets major in mathematics, and thirty-two enrolled in the new major in operations research, which is under the joint direction of the Department of Mathematical Sciences and the Department of Economics, Geography, and Management.

Shortly after the "Majors-for-All" program was instituted, provision for diversity was carried further by the introduction of graduate programs. Although the Academy was not permitted to offer a graduate degree, cooperative programs were arranged with civilian graduate schools in several different disciplines. The graduate program in mathematics began in cooperation with North Carolina State University. Three new graduate-level courses were introduced into the Academy curriculum: Math 542, *Mathematical Analysis*; Math 544, *Advanced Differential Equations*; and Math 546, *Probability*. Graduate credit was granted by the civilian university for these courses towards the requirements for the MS in Applied Mathematics. The graduates chosen for the program were thus able to complete the degree by taking courses at North Carolina State during the summer term and the fall semester. Thirteen members of the graduating class of 1966 were enrolled in this program. In subsequent years the numbers were smaller, but interest remained high among cadets.

In 1975, through action stemming from Air Force personnel policies, cooperative graduate programs were discontinued, and the 500-level courses were dropped from the curriculum.

The Teaching Methods

Although the Military Academy at West Point had a strong influence on the early methods of teaching mathematics at the Air Force Academy, the AFA Math Department gradually developed her own variations of the traditional teaching approach. The Department continued the West Point traditions of expecting cadets to prepare lessons thoroughly before coming to class and, once there, to participate totally, with always the possibility of extra instruction (EI) by faculty members outside of class for those cadets who need it. In addition, continual feedback about the cadet's math progress has been provided to both the cadet and his instructor through the years.

The "Lesson Assignment Sheets" for the first cadets, which simply listed the daily assigned reading and homework problems to prepare before class, are a far cry from the present "Notes to Cadets" which within the last ten years have become so detailed and comprehensive in some math courses that there is scarcely need for a textbook.

From the beginning, small class sizes (15-20 cadets) at both the Air Force Academy and at West Point were conducive to cadet participation, and although graded boardwork was not mandated at the Academy as it was at West Point, still at least as much time was given to cadets working problems at the boards as to expository lectures by the instructors, a practice that continues to this day.

Virtually unlimited EI is one feature that sets the AFA and West Point apart from other undergraduate institutions. In the early days, cadets signed a mathematics EI roster and

attended group EI sessions after classes in the afternoon. This group EI gradually gave way to more individualized EI with individual instructors until in the early 1970's, an "EI Room" was made available and manned by instructors for group EI all during the academic day, five days per week. The EI Room was short lived, however, and individualized EI, the efficiency of which is now being closely monitored, is again on the increase. Thus, though the mode of EI has fluctuated during the years, it remains one of the fundamental tools of mathematics education at the Academy.

Another fundamental principle that has survived the first twenty-five years at the AFA is that of giving continual feedback to both the student and his instructor about the student's math progress. Although the methods of administering tests and assigning grades to test results have changed since the AFA began, testing has always been frequent, comprehensive, and centrally controlled.

From the beginning, the Academy evaluated cadets almost daily by means of 5-10 minute quizzes called "graded recitations." Larger exams were administered every 10-15 lessons. These larger exams, called "graded reviews (GRs)," were comprehensive back to the previous GR and the results were used to reassign all the cadets in a course into homogeneous classes. The final exam of a course was comprehensive over all of the course material.

Throughout the first twenty-five years, each course director (the instructor in charge of a course) has written the exams for his course and has administered these same standardized tests to all of his students; however, the method of test administration has changed dramatically. In the beginning, the same test was given on succeeding days in every-other-day courses, but in response to the Academy cheating scandal of 1965, the White Commission recommended that different versions of the test be given on alternate days. Along the same line, the West Point cheating scandal of 1976 prompted an AFA decision to require

different versions of morning and afternoon tests given on the same day. This same 1976 change of policy dictated that no work done by cadets outside of class could be graded, which eliminated the graded take-home problem sets that had been especially prevalent in upper division math courses since the Academy began. Many math instructors view this elimination as an educational handicap that has had an adverse effect on math training in some upper division courses.

There has been one major departmental change in the assignment of grades since the Academy's inception. For most of the first twenty years, grades were based almost entirely on the number of standard deviations from the course mean (i.e., on the "curve"), with 70% required for a passing grade. In 1975, however, "contract grades" were initiated for the core math courses, certain predetermined percentage standards which, if attained, guaranteed the cadet a certain grade. This absolute standard allows the cadet to know at any time during the course exactly at which grade level he is working.

In addition to striving for excellent mathematics preparation of Academy cadets, the Department has from the beginning sought to prepare and maintain the teaching expertise of its instructors. One such preparation tool has been a training session during the summer for newly-assigned instructors, a short course that has evolved from a predominantly "practice teaching" medium to one that today also encompasses some orientation to the Academy as a whole. To maintain the high quality of lesson presentations, weekly lesson meetings are held for each course, during which the best methods of teaching the upcoming material are discussed. Also, an extensive, in-depth workshop for training course directors was presented in the summers of 1978 and 1979.

Faculty Research

In addition to teaching mathematics, which has always been the principal occupation of the Department faculty,

between 5% and 10% of our time has been spent in the general area of research: academic, educational, and "sponsored" research (consulting).

Since there has never been a "publish or perish" syndrome in the Department, relatively little pure academic work in mathematics and related disciplines has been done, and even of this amount, most has been done in completing dissertations. In spite of the lack of quantity, however, the quality of this work has often been high indeed. Presentation of papers at national meetings has been common and on at least three occasions our people have presented invited papers at international meetings.

With an eye to the future and a perpetual desire to improve the teaching of mathematics, the Math Department has done some educational research and experimentation in the areas of Computer Assisted Instruction (CAI), frequency of testing, self-paced individualized instruction, and homogeneous versus heterogeneous class sectioning. The results of such large-scale experiments as well as the continual striving of individual instructors for the improvement of their own teaching skills has helped propel the Department toward excellence in the field of mathematics education.

The third major area of Department research has been the "sponsored" variety, which is essentially problem-solving consultation done for other Air Force, Department of Defense, and Federal agencies. Since the first work on Gaming Functions for the Office of the Secretary of Defense/Systems Analysis, literally scores of projects have been undertaken for many different organizations. In each such project, a deliberate effort was made to involve cadets directly, or, should that not be possible, to bring the techniques and results of the activity back into the classroom. In addition to the direct impact on cadet education, this work has helped to keep our faculty current in their respective disciplines as well as to provide an inexpensive source of technical talent to the government.

In summary, through her great flexibility and her willingness to adapt curricula and teaching methods to the demands of a constantly changing faculty and student body, the Department of Mathematical Sciences at the AFA has developed the unique personality of her first twenty-five years.

Department of Physics

CHAPTER 3

**PHYSICS: DEVELOPING A PERSPECTIVE ON
NATURE'S LAWS***

Introduction

During the first twenty-five years of its existence, the United States Air Force Academy (USAFA) has graduated thousands of young officers who now serve on active duty as aircrew members, technical specialists, and program managers, to name a few major areas. The purpose of the Academy is clearly stated in its mission statement:

To provide instruction and experience to all cadets so that they graduate with the knowledge and character essential to leadership and the motivation to become career officers in the United States Air Force.

A sound, liberal education is a corollary to the mission statement. And, particularly in the highly technical environment of today's Air Force, an understanding of the physical laws and how they are applied are cornerstones. Of the 111 semester hours that every Academy cadet must complete regardless of major (the "core" course), 58½ semester hours are in engineering and the basic sciences. This heavy emphasis is justified since most Air Force officers become involved at some time in their careers with highly technical programs.

*Written by Lieutenant Colonel W. Pendleton, Lieutenant Colonel A. Peterson, Captain R. Bloomer, and Captain C. Catalano.

Physics has always been a part of this preparation for commissioning at USAFA. The Twenty-Fifth Anniversary of the Academy is an appropriate point to critically review the physics program in terms of the mission statement (that is, in terms of the needs of the Air Force) as well as in comparison with physics programs at other degree granting institutions. Just such a review was held in 1977.

The results of that review,¹ along with the philosophical perceptions of some long-term faculty members at USAFA and feedback from some graduates, provide an interesting perspective on physics education at USAFA during the first twenty-five years.

Development of the Physics Curriculum

The development of the physics curriculum in the past twenty-five years at the Air Force Academy has been driven by two basic forces; first, the growing need for highly trained specialists to meet Air Force requirements in a rapidly changing technological era and second, the need to educate all Air Force officers in a general background of this modern technology. In this light we can follow the growth of the physics curriculum both in the formation of a strong physics major and in the development of a broad physics core curriculum.

The early years of physics at the Air Force Academy reflect the traditional view of the military officer as a generalist, an individual trained in all areas with no specific academic strengths. The curriculum at USAFA was a prescribed

¹"Program Review," Final Report, Department of Physics, USAF Academy, Colorado 80840, November 1977.

curriculum, one required of all cadets with only minor variations. Departments had not been formed yet and chemistry and physics were combined under the Office of the Professor of Chemistry-Physics.

The first courses in physics offered at the Air Force Academy were the precursors of today's core sequence. Varying between two and three courses in the third-class (sophomore) year, the topics offered included hydrodynamics, heat and basic thermodynamics, electricity and magnetism, sound, light and optics, meteorology, climatology, and brief introductions to atomic and nuclear physics. The courses included laboratory experiments for which written reports were required.

The 1957-58 academic year brought the first signs of diversification. A series of "special courses" was offered to some cadets who met one of two qualifications. Gifted students could accelerate the pace at which they completed required courses and therefore have room in their schedule for the special courses, and students with previous college experience could validate required courses leaving room for the special courses. AY 57-58 was the first year the academic areas reached department status, and the new Department of Physics offered a special, three-course sequence in the areas of nuclear physics and engineering.

The next step in the evolution of the physics major occurred in 1960-61 with the division of the Air Force Academy curriculum into four broad areas or divisions with a major offered in each of the four. Physics was placed in the Basic Sciences Division. At this time, the Department of Physics added a third prescribed course to the core, introduction to modern physics. The special courses became requirements for the major in basic sciences, and the whole special course program changed its name to the "Enrichment Program" providing a variety of courses for the advanced or gifted student. In 1961-62 a course entitled advanced topics in physics was offered, bringing to the

Department of Physics for the first time some of the subjects associated with the traditional physics major. At this time, the Air Force Academy announced its intention to grant graduate degrees at the master's level, pending legislative approval. This plan manifested itself in the Department of Physics with the addition of a course in quantum mechanics and with the upgrading of the advanced topics course to a graduate level.

During the next several years, the enrichment offerings in the Department of Physics increased in number until the nucleus of a traditional physics major was developed. The graduate program was not approved and its demise was followed by the establishment of disciplinary majors in 1964-65. By this time the Department of Physics offered a full schedule of advanced physics courses for physics majors including modern physics, classical mechanics, quantum mechanics and electromagnetic theory. At this time, however, the physics core courses suffered a setback with the deletion of modern physics as a prescribed course. A small portion of the remaining two courses was eventually devoted to a survey of modern physics.

The physics major and core courses remained virtually unchanged in the ensuing ten years. The core physics surveyed classical and some modern physics. Mathematical rigor was not emphasized. The physics was similar to that of most undergraduate curricula in the country. In 1966-67 an atmospheric sciences minor was approved. Two courses were offered that year in the subject with two more added the following year. Also in 1966-67, a cooperative graduate program leading to a master's degree was established with Ohio State University. This program lasted until 1974-75. During this time the emphasis in nuclear reactor physics gradually declined due to diminished Air Force interest and all courses in this topic were deleted.

The latest changes in the physics curriculum involve the reinforcement of the core course and the addition of the

engineering-physics track to the physics major. A third core course was added to be taken in the first class year. This new course culminated a strong physics core with a general review of classical physics and a penetrating introduction to modern physics. This course became a requirement starting with the class of 1979. The two courses in classical physics were restructured to include a more rigorous treatment of physical laws with a heavy emphasis on calculus and vector algebra, and the laboratory portion of these courses was eliminated. The physics major was changed to include an engineering physics track, and the atmospheric physics minor was changed to a separate track similar to the engineering physics track. The engineering physics major includes a reduced schedule of traditional physics courses but adds a specified number of courses in one of seventeen separate engineering and science disciplines. The engineering physics was introduced to meet the needs of the Air Force in the area of applied physics-engineering disciplines.

No program can remain viable that does not evolve or at least retain the capability of evolving. The Department of Physics maintains a flexibility in this direction with internal and external program reviews to meet the changing requirements of the Air Force.

The Purpose and Present Content of Core and Physics Majors Curricula

The total academic curriculum at the Academy is designed to develop future Air Force officers whose minds are innovative, analytical, and resourceful. Thirty-seven core courses are required of all cadets to give them a broad exposure to the fundamentals of science, engineering, humanities and the social sciences. Physics is an essential part of this core both because of the unique knowledge it provides in certain areas and because of the basic knowledge it provides in areas developed in other core engineering courses. As such, physics courses both serve and are served.

The first course in physics taken by cadets, Physics 211, emphasizes the fundamental principles of mechanics, thermodynamics, and fluid dynamics. It calls on skills and concepts already introduced in core mathematics and mechanics courses, introduces new concepts and emphasizes further development of analytical skills, and builds a foundation for later core courses in aeronautics and astronautics.

The second physics core course, Physics 311, deals with electromagnetic theory and provides the cadets' only exposure to the critically important field of optics. It builds upon previous mathematics and physics courses and also serves as a foundation for core electrical engineering courses.

The final physics core course, Physics 411, is designed to be a culmination of the cadet's science and engineering core experience. It is intended to tie together all the previous science and engineering experience under the basic conservation laws of nature—conservation of charge, mass-energy, and momentum. These laws are then extended into the modern physics realm so that the cadets become knowledgeable in areas such as laser systems, nuclear power and nuclear weapons, energy and environmental problems, and developing technologies.

The core experience is sufficient physics background for most Air Force officers, but the need exists for a few new officers each year to have a deeper understanding of physics. The three-track physics major fulfills this need by offering selected cadets the challenge of a difficult academic program while preparing them to serve the Air Force in a broad spectrum of assignments. The physics major consists of a traditional track similar to programs at civilian schools, an engineering physics track which offers the fundamental emphasis of a physics program with a limited specialization in a wide variety of engineering and science options, and an atmospheric physics track which specializes in the environment in which the Air Force operates. Details of these programs may be found elsewhere.²

²United States Air Force Academy *Catalog 1978-1979*, pp. 131-2.

Program Review

In November 1977, a physics program review was held at USAFA to examine critically both the core and majors course structures to determine how they compared with curricula at other institutions, and to evaluate how well-prepared Air Force Academy graduates are to meet the needs of the Air Force. This section highlights certain topics from the final report submitted from that review; it provides a view of where we are now.

Participants included representatives of several university physics departments, several Air Force laboratories (AFWL, AFGL, FJSRL, AFTAC)*, other research and development organizations (SAMSO, DNA, NCAR)*, and some other individuals. Detailed briefings were given on the courses offered, tracks available to our majors, research within the department, and the disposition of physics graduates in recent years. Then, verbal and written comments were solicited from participants.

The review occurred just as Physics 411, the third core course, was being offered for the first time and when a multi-track major option (atmospheric, engineering, and traditional physics major) was being implemented. The timing of the review was, therefore, important.

Written critiques on the new three-core course sequence for non-physics majors were, in general, very positive. No strong consensus was evident for changes of course content, level, or suitability. The question of laboratories, however, was an exception since most respondents insisted that labs were necessary even in the core and even for "poets." Two-hour labs were considered by most as a minimum useful

* *Editors' note:* AFWL, Air Force Weapons Laboratory; AFGL, Air Force Geophysics Laboratory; AFTAC, Air Force Technical Applications Center; FJSRL, Frank J. Seiler Research Laboratory; DNA, Defense Nuclear Agency; SAMSO, Space and Missile Systems Organization; and NCAR, National Center for Atmospheric Research.

length. In the past the department has considered lab exposure in other core courses to be adequate; therefore, giving up already overtaxed lecture time for labs has not been considered worthwhile.

With regard to the majors courses, comments were again very favorable particularly with regards to graduate school preparation. Some respondents felt that new course material should be added for the physics majors (particularly in areas like solid state and electro-optical physics), but there were no indications of what should be given up to allow time for new topics. (Later in this paper a rotating series of special topics courses is discussed which partially answers the criticism.)

During discussions one of the most popular suggestions to improve the majors program was to institute regular, formal seminars or colloquia to increase exposure of students to the Research and Development community and Air Force Systems Command. Since the review, a regular colloquium has been established and many cadets attend, although the thrust of the talks has been directed at the faculty.

All but one of the respondents felt that research is important and appropriate in the department. The suggestion was made that group research projects be instituted; up until now essentially all research has been done individually. The respondents also suggested that people might be recruited to come to the Academy based upon research background and the projects currently underway in the Department of Physics.

The entire atmosphere of the conference revealed no glaring problems in either our core or majors divisions; rather minor, but rarely agreed upon, suggestions indicate that a slow, continuous revision of programs will produce best results.

Career Feedback from USAFA Physics Graduates

One measure of the success of any program is to look at the program's products in the "real world" application. Measuring the effect of the core on non-physics majors would be very difficult; in fact, the results of such a study would be dubious since a non-physics major doing a non-physics related job would have difficulty responding to questions about the physics program at USAFA. However, measuring the effect of our majors program on physics majors doing primarily technical work on active duty is more direct. In fact, such a measurement was made as part of the 1977 Program Review mentioned in previous sections. Selected results from the final report are given here (updated to include the Class of 1978 except where noted otherwise.)

The physics major has always been a relatively small major at the Academy as indicated by the numbers in Table 3-1.

Table 3-1. Number of Graduating Physics Majors

<u>Class</u>	<u>Number of Majors</u>
66	4
67	11
68	18
69	11
70	25
71	17
72	24
73	18
74	13
75	9
76	12
77	12
78	7

One question posed, but for which there does not appear to be a definite answer, is—"Is there an optimum number of physics graduates from the Academy that the Air Force can use each year?" Several participants at the Program Review felt that because of the broad, general education nature of a physics undergraduate program, there should be no limitations on the number of physics majors graduating each year. On the other hand, it was recognized that there are probably limited opportunities for a graduate with only a B.S. in Physics to enter the laboratory structure and contribute effectively.

In looking at Air Force Academy graduates with physics degrees, a suitable (and revealing) starting place is with assignments. Table 3-2 lists first and subsequent assignments before and after 1970. The trend away from graduate school is obvious.

Table 3-2. Assignments for Physics Majors

	<u>1st Assignment</u>		<u>Subsequent Assignment</u>	
	<u>Thru 70</u>	<u>After 70</u>	<u>Thru 70</u>	<u>After 70</u>
Grad School	34	18	8	3
UPT	23	55	9	4
UNT	3	10	-	-
Missiles	0	5	0	3
AFWL	2	4	10	4
Weather	3	5	-	-
Technical	3	10	10	2
Other	1	5	-	-

This trend reflects not graduate preparation changes but rather Air Force needs and policy. The Air Force Weapons Laboratory has been the largest single user of graduates. Retention of these graduates is not significantly

different from the average of other departments. Through 1977, retention of graduates of the classes of 1972 and earlier was 74%. No analysis of graduates would be complete without noting that there have been five Hertz Fellowship winners and one Rhodes Scholar from within these ranks.

Before the Program Review a questionnaire was sent to as many of the physics graduates as could be located and eventually about one-third of the graduates responded. Some of the questionnaire results are shown in Tables 3-3, 3-4, and 3-5. Several trends are obvious. In the first place, being a physics major is perceived to be a generally positive credential in a person's career. Second, graduates tend to remember certain courses to be more useful than others; the laboratory is perhaps a surprising leader here but probably simply reflects the hardware-oriented jobs that our graduates have come in contact with. Third, Table 3-5 provides valuable feedback. In the first place, one-third of the graduates who responded could not come up with suggestions on what improvement could be made. Further, if you eliminate the requests for more applications and career counseling (although important, not directly requesting curriculum changes), indeed over one-half could not suggest an emphasis change in course offerings.

**Table 3-3. How Has Your Physics Education Helped
(or Hindered) Your Career?**

Helped Very Much	11
Helped	26
Haven't Really Used It	11
Hindered	1
Flying Has Hindered Physics Career	3

**Table 3-4. What Specific Courses Do You Feel
Helped Most of Least?**

<u>Course</u>	<u>Most</u>	<u>Least</u>
Electricity and Magnetism	12	4
Laboratory	11	
Classical Mechanics	11	1
Core Physics	9	
Quantum Mechanics	6	7
Modern Physics	4	
Math Courses	4	
Independent Study	4	
Statistical Thermodynamics	3	4
Lasers	2	
Optics	2	1
Technical Writing	1	
Plasma	1	1
Nuclear Engineering	1	1

**Table 3-5. What Could Be Done That Was Not Done
To Make Your Program Better?**

More Applications	6
More Career Counseling	6
More Mathematics	6
More Computer Related Work	5
More Laboratory	4
More Personal Interactions	3
Offer Optics	3
Offer Solid State	1
Offer Problem Seminar	1
No Suggestions	16

Two changes since the Program Review should be mentioned in this context:

First, with regard to the indication that more counseling should be done, the Department of Physics has initiated a regular colloquium series to deal with several topics: physics, aspects of teaching, and the military as a profession. Although directed primarily toward faculty, cadets are being encouraged to attend, particularly when the topic relates to the Air Force as a career. This supplements, of course, counseling on a "one-on-one" basis from advisors in the department.

Second, with regard to more applications, one of the best ways to understand how physics is actually applied (even better than attending the colloquia mentioned above) is to participate in the Summer Research Program and spend six weeks at an Air Force laboratory. This program is growing

and the number of physics majors who participate has increased recently. Even more growth would be beneficial. Along the same lines, a four-topic sequence of special topics courses will be given each two-year (four semester) cycle. This sequence will broaden the horizons of physics majors in the areas of optics and plasmas, for example.

The Program Review feedback from graduates indicates general approval from people in "the field." Any changes in the majors division curriculum should be done slowly with great forethought.

The Future

So far we have discussed the past and how things are now. What about the future? While inherently uncertain, one thing can be said for sure about the future of Physics at the USAFA if the past is a guide: It will change. The development of our physics teaching has been marked by change, changes in course offerings and content, changes in emphasis, level, and pace, and changes in style and techniques. These changes have been driven by many forces: academic requirements, resources, manning, mission analysis, and personalities. There is, therefore, every reason to predict that these same factors will continue to cause changes. In fact, to suggest otherwise would mean that we were satisfied with our program and that we were not maturing.

These inevitable changes, however, do not happen at random. There is a common denominator behind them all; it is called the mission. This paper began with a statement of the overall Academy mission. It should be reemphasized that this is not just the Academy mission but the faculty mission, the Department of Physics mission, and the mission of each instructor in the Department of Physics. It is this commonality which ultimately determines what we teach, when we teach, how we teach and who teaches. It guides our summer programs, our instructor selection, our department

organization and, ultimately, is a measure of our effectiveness.

So much for generalities. What will happen to physics teaching at the USAFA? In the area of curriculum development, three major efforts are underway:

First, having now nearly completed two semesters of experience with Physics 411 as a core course, it is time to review the content, level and organization in light of its capstone objective. A course review will soon be held in consultation with the other engineering departments. This review will identify areas of improvements and result in changes for the future.

Among our majors courses we will continue to develop the four-course special topics sequence. We have offered a semester of optics and are presently teaching a course in plasma physics. In the fall of 1979, relativity will be on the agenda followed in the spring by solid state physics. With a repertoire of these four topics, we can offer our physics majors some options and breadth in areas of physics which are particularly relevant to the Air Force.

The third development on the horizon which will surely impact physics is the establishment of a faculty-wide honors program to challenge and broaden our better students. Taking a hint from earlier days, we envision the introduction of honor sections in one or more of our core courses. Such a section or two of highly motivated and competent students would enable more and deeper coverage of basic concepts and applications. As a part of any interdisciplinary honors courses, we would expect participation by the Department of Physics. Such seminars would not only help cadets integrate their knowledge but challenge and stimulate the faculty as well.

In noncurricular areas we also expect to see steady improvement in the accurate evaluation of cadet learning. Each core course has an extensive exam question file with statistics and question evaluations. In addition, several

resource development projects are in progress. One, for instance, deals with extended write-ups of physics demonstrations for use in the classroom; another will result in a potpourri of examples of how physics principles apply to real Air Force systems. This resource notebook will be complete with system data, worked examples, and discussion questions about the concepts and implications. Those efforts should make physics more exciting for the students, and remove their work from so much meaningless number crunching.

In conclusion, physics has and will continue to have a key role in the Academy academic program. This role is assured to the extent that the Air Force continues to be at the frontier of technological development and to the degree that the Department of Physics remains committed to the Academy mission of excellence.

Department of Aeronautics

CHAPTER 4

A LOOK AT THE AERONAUTICS MAJOR*

The Department of Aeronautics, in existence since the organization of the Air Force Academy, has offered an Engineering Council for Professional Development (ECPD) accredited Aeronautical Engineering degree since 1967. The number of Aero graduates has grown from fourteen in 1967 to eighty-five in 1978. We are proud of our performance, both in terms of the instruction and preparation we have given our Aeronautical Engineering graduates, and in terms of our contribution to the Academy core program; however, in recent years, we are finding it increasingly difficult to meet the demands imposed by ECPD accreditation and the ever-increasing tendency to reduce the number of majors courses in the cadets' education. During these years, we have been forced to retreat from a strong majors program to what we now consider the minimum program possible to maintain ECPD accreditation.

We are the first to recognize that our primary mission, as stated twenty-five years ago, is to educate and motivate career Air Force officers. The education of qualified Aeronautical Engineers must and does take a secondary mission role. Our contention is that these two roles need not be mutually exclusive.

In the following discussion we hope to show that we have continually striven to tailor our program directly to Air

*Colonel Daniel H. Daley, Lieutenant Colonel William A. Edgington, Lieutenant Colonel Roger W. Gallington, Major John P. Retelle, Jr., and Captain Eric J. Jumper collaborated on this chapter.

Force needs while still maintaining academic credibility. At the same time, we recognize the need for broadening our future Air Force leaders and do not mean to imply that all the changes over the years have not been beneficial. We do, however, contend that a further degradation of the aeronautical engineering major means an end to ECPD accreditation.

Determining Air Force Needs and Accommodating Them

While we cannot predict the future, we feel that we have created one of the finest ways of determining present Air Force needs and getting an accurate picture of needs to come. Our method is in the form of an advisory panel composed of all members of the Aeronautics Department, both presently assigned and formerly assigned. This panel pool has grown, in our twenty-five years of existence, to over one hundred fifty. Of these, some have risen to key positions in the decision-making chains of future development plans for the Air Force, others work in present development roles, others in procurement and maintenance of present Air Force systems, and still others are concerned with day-to-day operational needs. Also included in our membership are retired officers involved in industry and, not least importantly, retired members who advise in a historical perspective.

In the fall of each year the advisory panel meets to discuss our present curriculum and suggest possible changes in direction or emphasis. The panel members do not come unprepared; they have received various updates on planned or implemented changes to the program over the year since their last meeting. A faculty member is assigned the task of recording promising suggestions and documenting plans of attack for future use. Additional faculty members on the Advisory Panel include the chairman and several members of the department curriculum committee.

The department curriculum committee is our main tool for updating our program to meet the suggestions of the advisory

panel. Its function is to monitor the content of each department's course and preside over such things as textbook selection, topic addition and deletion, as well as to suggest possible new course additions or old course deletions.

Changes without feedback are unproductive. Even the most well-intentioned changes sometimes cause unforeseen difficulties. To avoid, or at least soften the ill effects of such changes, we often first create an experimental course which is allowed to evolve over a number of semesters to monitor the "teachability" of the course topics as well as the effect on follow-on courses. It is not unusual to have several experimental courses running in conjunction with old courses covering essentially the same topics (to try a new text, for example). We consider this method of feedback internal, that is, a method which includes only instructor and student feedback.

Our feedback, however, transcends the bounds of the Academy; we maintain a sizable graduate data capability. Through the use of questionnaires and as much personal communication with our graduates as possible, an assigned member of the department solicits views of graduates as a regular department duty. Views on the usefulness of course material, for example, are monitored to include those of our new second lieutenant graduates all the way to graduates who have moved into field grade ranks.

We have been not only aware of our need to be directly applicable to Air Force needs, but also have taken great care to learn what those needs are and how we might best meet them. The combination of information, the advisory panel; of implementation, the curriculum committee; and of feedback, the graduate data program, not only demonstrates our function with regard to responsibility, but also demonstrates the innovation with which we have embraced this responsibility.

In addition to curriculum changes to fit Air Force needs, an Air Force peculiarity has continually surfaced and our

attempts at dealing with it deserve some discussion here. The peculiarity is that many, if not most, of our graduates go directly into the cockpit. It is during these early years that it is essential to reinforce the principles delivered in academia so that these principles are not forgotten. Because of the subject of our major, the time in the cockpit should be a reinforcement of earlier engineering training. Unfortunately, the human brain tends to put information in little compartments, which becomes too painfully obvious to any instructor trying to make surface some piece of information from semesters gone by. The obvious first solution is to make those compartments of knowledge larger so that they include the years our graduates serve in the cockpit.

Our attempts at compartment broadening have led to the use of aircraft as teaching devices. That practice is not a new technique, but is in common use in practical aeronautical engineering programs throughout the country. Over the years we have used the U-10 Helio-Courier and the U-4 Aero Commander (the aircraft formerly used in conjunction with the cadet parachuting program) to measure aircraft performance and flight characteristics. Sailplanes have been used to apply basic aerodynamic principles and to determine the accuracy of manufacturer's stated performance. More recently we have used T-37 flights to aid in teaching our courses in flight mechanics and aircraft design. The feedback from these attempts at broadening the aeronautical engineering compartment has been overwhelmingly positive by students, faculty, and graduates.

These attempts, however, have met with no little difficulty. Variation in aircraft of the same type have lead to difficult data anomalies, scheduling problems have become almost insurmountable, logistics problems associated with flying out of Peterson AFB, and the constant flux of mission pilots have continually suggested abandonment of our hopes to integrate, in some unintrusive way, the airplane into our program.

One of our most profitable experiences in using an aircraft involved our distinguished visiting professor, Dr. David Kohlman, who brought with him a light research aircraft, the Red Hawk. This occasion gave new impetus to the question of why the Academy cannot take the usual approach of leasing an FAA-certified passenger aircraft with our own faculty members as pilots. This avenue is not without military academy precedence; in fact, it is the approach taken by the Naval Academy. In the future, then, we will be more insistent that this is also the correct approach for the Air Force Academy.

Academic Credibility

So far we have concerned ourselves with our attempts to tailor our program to Air Force needs, but the point should also be made that we have done this tailoring in a responsible way, keeping in mind the metric of our civilian counterparts. It is a matter of record that the Aeronautics Department has been the most active in exploiting the benefits of the Distinguished Visiting Professor and Visiting Scientist programs.* In using these programs, we have been able to assess our curriculum from an inside look afforded by our visiting faculty. The feedback has not always been glowing; however, it has not always been without praise and applause.

*In the summer of 1975 the distinguished visiting professor program began at the Academy; the Department of Aeronautics was one of the first two departments to participate. Dr. Gordon Oates, University of Washington, was with the department from July 1975 until July 1976. He was followed by Dr. David Kohlman, University of Kansas, who was with the department from July 1976 to July 1977. Our participation in the program continued with the addition of Professor Thomas Gregory, NASA Ames, from July 1978 to July 1979. A new program, the distinguished visiting scientist program, was initiated by the Department of Aeronautics in conjunction with the Air Force Office of Scientific Research in 1978. Dr. G. David Huffman, Purdue University, was with the Department from July 1978 to July 1979 under this new program.

Obvious to them are our close ties with Air Force needs and our willingness to adapt to new techniques and technology. It is also apparent to them that our reduction in majors courses is leading to eventual failure. They have carefully monitored our trimming of courses and advised us of the minimum acceptability according to the standards of their respective institutions.

Where Do We Stand and How Did We Get There?

Where do we stand now? We stand thoroughly convinced that our graduates are assets to the Air Force. We realize that the academic broadening our graduates receive is important in their development as Air Force officers. We do not exclude the possibility that being on the bare minimum ECPD accreditation point is the proper place for a military academy. We are, however, totally convinced that we can not further reduce the Aeronautical Engineering major and, in fact, would be somewhat more comfortable to strengthen slightly our present program.

In the years of program building we were afforded the luxury of developing a very strong Aeronautical Engineering major. While it is possible that the program could have been interpreted as too focused, we still felt that our goal of producing the best possible Air Force officer was being met, especially, we thought, through the inputs of our Advisory Panel. But, in only a very short time period of five years, we have been forced to reduce our curriculum to the bare minimum.

Obviously, since we have never seen any problem with producing Air Force officers through our carefully prepared Aeronautical Engineering curriculum, the change over the past five years did not come from internal suggestions. The main catalyst to these changes was the Academy's twenty-year study. The result was a 13% reduction (4.5 courses) in the number of courses our majors could take in Engineering and Basic Sciences without overloading. Our initial reluctance

to accept the sweeping changes suggested by that study was overcome by the realization that it is always difficult to be objective about a program that we had created and felt comfortable with. A new sense of awareness for the demands placed upon a cadet's time was awakened and we began to trim our program.

Now we must evaluate our position and look again at our program of five years ago. At that time we felt good about our graduates in terms of Air Force officers and in terms of Aeronautical Engineers; now, we feel good about our graduates in terms of Air Force officers, but are beginning to feel uncomfortable about them as Aeronautical Engineers. Perhaps our view of five years ago is somewhat shortsighted and we were bordering on luxury, but today we may have cut our program too far.

Conclusion

Our conclusions are obvious from the above discussion. We have never seen any disparity between educating Air Force officers and Aeronautical Engineers. We think we have created a practical tool for assessing our applicability to Air Force needs and of ensuring avenues for steering our program back on course when we find our applicability lacking. We encourage a wider role for aircraft in our teaching technique. Finally, we think the restrictions of the twenty-year study have damaged, somewhat, the credibility of the major.

We recommend backing down somewhat from the suggestions of the twenty-year study, not to a position of five years ago, but to something in between then and now. A strong core program can be maintained while still allowing for a small increase in the number of our majors course offerings. At a very minimum, in order to preserve ECPD accreditation, we insist on not going any further in deteriorating the majors program.

Department of Astronautics and Computer Science

CHAPTER 5

COMPUTERS AND SPACE: A SUCCESSFUL MARRIAGE OF DISCIPLINES FOR THE FUTURE*

The prospect of writing (or reading!) a twenty-five year review of anyone's history is certainly staggering to the imagination. An individualized and introspective view into the formation, development, and continued growth of an academic discipline, however, does pose some interesting questions. What should be this review's purpose? How must it be organized? And most importantly, what should it seek to tell? However intimidating this task might seem, it is my obligation to pursue it—if not without some trepidation.

The academic discipline of Astronautics has been embodied within the Academy curriculum since 1958 when it was created under the direction of Colonel Benjamin P. Blasingame. The first course in basic astronautics sought to teach basic physics of space flight. From that auspicious start has evolved an academic major with its own separate and independent department. But how did Computer Science enter the picture? The first computer-type course at the Academy was "Introduction to Machine Computations" offered first in 1958 by the Mathematics Department. The discipline became part of the Astronautics Department in early 1965—but now I'm getting ahead of myself. I'll discuss more about the evolution of the Department of Astronautics and Computer Science (DFACS) later in this article. First, let's take a look at what the Astronautics and Computer Science disciplines are all about.

*Written by Captain Charles F. Stirling, Assistant Professor of Astronautics.

Contributions

Astronautics is an area which is becoming increasingly important in today's Air Force. With the advent of the Space Shuttle Era, more and more of our officer graduates will become involved in the new frontier of space. Fortunately, most Academy graduates are prepared for this new era since they were all exposed to fundamental astronautics in their cadet years. The commendable foresight of the curriculum planners in the Academy's formative years must certainly be acknowledged today, and the contributions of graduate majors are certainly impressive. Graduates are working in every major space program we have and more are joining their ranks every year. Satellites, boosters, and ballistic systems all bear the mark of Academy trained astronautical engineers.

Computer Science is a relatively new academic discipline, being an outgrowth of the advanced technologies of the 50s. The contributions of this discipline, however, are certainly not difficult to highlight. The revolutionary impact of computers on society today is staggering. In just a short time, computers have invaded every arena of society, simplifying man's tasks immeasurably while making others possible. The prognosis for the future is fantastic. Since the Class of 1969, Academy graduates with computer science degrees have grown in numbers. Each year brings new graduates to join the many others already making significant contributions to this discipline.

History and Development

As referenced earlier, Astronautics became an academic discipline in 1958. The department, part of the Division of Applied Sciences, taught one two-hour course in basic astronautics to the first class, 1959. Colonel Blasingame was the first department head. He was succeeded by Colonel Richard C. Gibson in 1960. As the Astro major began to develop, work on an "in-house" text was initiated. Three astronautics

courses were taught, all elementary material, in addition to three advanced "enrichment" courses in guidance and celestial mechanics. In the area of Computer Science, the Department of Mathematics had a course, "Introduction to Machine Computations," which appeared to be the first reference to any type of computer course here at the Academy. In 1959-1960, the Division of Applied Sciences, under the chairmanship of Colonel Dual H. Dane, offered courses in Aerodynamics, Astrodynamics, Electrical Engineering, Mechanics and Thermodynamics. The instruction in each of these areas, including Astronautics, placed emphasis on Air Force applications. Laboratory work augmented the classroom effort to increase the cadet's ability to apply the scientific methods to the solution of problems and the evaluation of experiments.

During the 1960-1961 era, emphasis continued on Air Force applications. The Astronautics Department offered three enrichment courses in guidance and control and advanced astronautics. During that academic year, the Department of Astronautics reevaluated its existing courses with the objective of defining the direction of the major. In Spring 1961, the department started to rewrite most of the material required for texts. The major was becoming a very specialized course of study for only the brighter students. This trend would continue for many years—until about 1972, as we will see.

In 1961, the Department of Mathematics offered a new course devoted to the study of Fortran programming language. They also taught a course in digital computer programming which consisted of general information concerning digital computers and programming techniques, introduction to Fortran programming, and numerical analysis topics. These numerical analysis topics included interpolation, integration, and solutions to differential equations. The initial phase of the first course was a brief review of more sophisticated programming techniques and requirements of

the Western Data Processing Center, an organization which served to run card decks of cadet programs through the mail. This was the first integration of a computer-type operation into a course here at the Academy. About the same time, the Astro major offered courses in the areas of astronautics, space technology, ballistic and space vehicle guidance, and linear control systems analysis. Also, during this period, the department proposed a four-course sequence for the better engineering students and a two-course sequence for the remaining cadets. This was the first recognition of a need to provide two types of courses — one a "gentlemen's" astro, and the other for majors.

Colonel Francis Hale succeeded Colonel Gibson as Professor and Head of the Department of Astronautics in 1962. Colonel Gibson had been named Assistant Dean for Research and later became Commander of the Frank J. Seiler Research Center. The line-up of courses was unchanged. One course was added, however, in ballistic and space vehicle design and guidance. Due to the difficult nature of the astronautics major, it was designated one of two areas to offer graduate-level work. This experiment continued for several years. Cadets pursuing these master's programs had to have completed the 145½ semester hours prescribed for graduation in an undergraduate major by the end of their third year at the Academy. Many of the students involved in these programs, of course, had prior college experience. The Astronautics master's program was designed to contribute to the preparation of future astronauts for whom the time saved in being able to secure a master's degree would be an important factor. It also assisted in the preparation of officers well qualified in the sciences to administer the Air Force research and development programs. The Air Force Academy could not, however, actually grant these degrees, so made arrangements with Purdue University and later, Stanford University, under a cooperative master's degree program in Astronautical Engineering.

During the years 1964 through 1965, the prescribed Academy curriculum majors included the basic sciences, humanities and military areas, but did not include astronautics. That discipline was still under the topic of an enrichment curriculum major and was also listed as a graduate level program. In the Mathematics Department, a computer science course, "Digital Computer Laboratory," was offered to introduce the student to digital computer programming and teach him enough that he could write moderately difficult programs in Algol for a newly acquired Burroughs B-5000 computer. In July 1964, the newly created Frank J. Seiler Research Laboratory began to operate and manage this digital computer. This computer, which had been in the process of being specified and selected for nearly two years, was one of the most modern available. It was a solid state computer especially designed for Algol programming language, and was of modular construction, so that it could be expanded to meet the future instructional research needs of the Seiler Laboratory and of the Air Force Academy. The availability of computation and information processing capabilities in the form of the digital computer was considered essential in the basic research of the Seiler Laboratory. The Seiler requirement permitted digital computing to be made a part of the curriculum and provided the means for teaching advanced science and engineering courses.

The original Office of Aerospace Research proposal recognized this basic tenet and provided for its full use agreement whereby the Seiler Laboratory would furnish adequate computer time to the Academy. A data automation proposal to establish a research and education computer system had been proposed to HQ USAF on 1 November 1962. Authorization was granted on 20 February 1963 and in June 1964, the Burroughs B-5000 became operational. The initial investigation and experience with remote consoles, programming, problem solving, data storing and retrieval, and computer assisted instruction were accomplished using a JOSS Console of the Rand Corporation, a teletype console to the B-5500 computing system at the University of Denver

Research Institute, and six teletype consoles to the General Electric 635 Computing System at the Rome Air Development Center.

Early experience was most encouraging and afforded a variety of applications and capabilities. Usage of the B-5500 terminal to Denver permitted a familiarity with the existing capabilities of the B-5500 Data Com Operation System, or DOS, and in addition, provided a means for exploring the several conversational languages in a basic tutorial logic from programmed instruction. Laboratory scientists, faculty members and cadets used JOSS extensively for problem solving applications as well as one time computations. Very soon, however, it became apparent that preliminary estimates of its use were too modest. The increase was reflected both in the cadets' class work and in the research work of Seiler Laboratory and the faculty. The Computer Division of Seiler Laboratory had previously anticipated a marked increase in its workload, and in January 1965, it processed a data automation proposal to expand its capabilities. Toward the end of 1965, approval was secured for the purchase of a disk file storage capability. Also, the Burroughs Corporation modified the computer from the B-5000 configuration to the B-5500 configuration. This modification increased its speed and flexibility and combined with purchase of the disk file, was to keep the computer operation within the desired shift operation for the next year.

Also, in 1964, a significant transition occurred. It is the first time that two courses entitled "Digital Computer Laboratory" and "Digital Computer Numerical Analysis" appeared on the list of courses offered by the Department of Astronautics. Up until that time, the Department of Mathematics had taught these courses. In January 1965, the courses officially became the responsibility of the Department of Astronautics. Coincidentally with the transfer of responsibility of computer science courses, three officers were transferred from the Department of Mathematics to the

Department of Astronautics. In addition, the Department of Astronautics incorporated more material requiring the use of the digital computer in its own courses. Colonel Roger Bate remained Professor and Head of the department during this period, but was on sabbatical leave attending graduate school at Stanford University. Lt Col Richard G. Korthals was Professor and Acting Head of the department. All computer science courses were incorporated into the astronautics curriculum during 1964. Introduction of problems requiring use of the B-5500 computer continued in more of the fundamental astronautics courses (in particular, the control systems course, the guidance course, and the second semester basic astronautics course).

The Guidance and Control Laboratory originated during this time in the area where the computer center is located today. The collection of surplus equipment used to augment classroom instruction was later replaced by a new facility in the expanded area of Fairchild Hall, including sophisticated test instruments, and a unique stable platform. The table weighs 450,000 pounds and is so precise that a set of keys placed on the table upsets the balance to the extent that flashing lights warn of the irregularity. The table, the only one of its kind in the United States, is used to test inertial instruments such as gyroscopic instruments and acceleration sensors. Pneumatic cylinders support the table under computer control, keeping the test pad perfectly level, eliminating even small vibrations from the ground. Seismometers monitor movement of the pads and control unwanted motion. The table is an extremely sensitive and useful test instrument of great value to advanced inertial instrument development.

The Astronautics major in 1965-1966 continued as an enrichment curriculum major extended beyond the prescribed curriculum major in Engineering Sciences. During this year, Professor and Acting Head of the department was Lt Col Roland D. Thomas. Course work covered the same elemen-

tary and advanced astrodynamics, linear control systems, space technology and aerospace vehicle guidance and navigation.

During 1966-1967, the Academy board approved the inclusion of new courses entitled "Intermediate Digital Computer Programming" and "Advanced Digital Computer Programming." In January 1967, the Department of Astronautics was renamed the Department of Astronautics and Computer Science to more accurately describe the enlarged mission of the department. Colonel Roger Bate was appointed Professor and Head of the department. The Computer Science major became effective with the Class of 1969 and several new computer courses were added to the curriculum. In the spring semester, a new course in "Intermediate Digital Computer Programming" was offered for the first time. The Board approved three new courses to be offered in subsequent semesters as part of the Computer Science major curriculum. These included "Information Retrieval and Simulation" and "Programming Systems I & II." In all of its courses, the department emphasized utilization of the digital computer. It provided computer programming courses for faculty and staff members during each semester and the summer months as well as programming assistance to members of the faculty and cadets who were undertaking advanced computer programming projects.

In 1967-1968, Lt Col Jacob C. Baird was the Acting Head of the department while Colonel Bate served as Acting Head of the Mathematics Department. Minor changes were made in names and course offering times and prerequisites for the various Astronautics courses. A newly structured design sequence in control systems was taught for the first time in the spring semester.

By 1970, increased computer activity, including the addition of time sharing, rendered the computer power available in the B-5500 inadequate; and planning for a follow-on computer system was initiated.

Also in 1970, Colonel Roger Bate was appointed Vice Dean and Lt Col Bradford W. Parkinson, Associate Professor, served as Acting Head of the department. The major in Computer Science at this time provided a general undergraduate program in various areas of computer research and application of computers. Two graduate level courses were offered to complement the basic undergraduate program. Astronautics experimented with contract grading, a first for the Academy.

In July 1971, the department assumed management and control of the Education and Research Computer Center (ERCC). Courses offered during this period included those in astronautics, astrodynamics, linear control systems, inertial navigation and guidance, ballistic and space vehicle design, and control system theory. In the Computer Science area, there were courses in basic programming, computer simulation, intermediate computer programming, information and systems design and courses in artificial intelligence, list processing, and string manipulation. All cadets were required to take the basic Computer Science course, designed to provide all graduates with at least a rudimentary knowledge of computer operations. During that year, the Academy Board approved a new 43 course unit Astronautics major. This major completely replaced the existing Astronautics major effective with the Class of 1976. In return for the transfer of the ERCC to the department, the Seiler Laboratory also assumed control of the stable platform and associated support equipment within the Guidance and Control Laboratory. Computer science also introduced contract grading to the curriculum during this year after the successful astro experiment in 1970.

Colonel John P. Wittry was Associated Professor and Head of the department in 1971-1972. Lt Colonel Monti D. Callero was Deputy Head for Computer Science, and Lt Colonel Albert E. Preyss served as Deputy head for Astronautics. A team of department officers was deeply involved

with the selection of a new computer for the Education and Research Computer Center. A Burroughs B-6700 was authorized during this fiscal year with an installation date of 1 July 1972. Hardware and software conversion training and necessary conversions of most academic programs were completed. The new computer was eight times more powerful and incorporated a capacity of extended user access. The department offered a major in astronautics, a major in Computer Science, both of which were continuing, and the new major in Astronautical Engineering. Two cooperative graduate programs—at Purdue and Standord in Astronautics and in Computer Science at UCLA—were also continued.

Colonel Wittry continued as Professor and Head of the department in 1972-1973. Lt Colonel Callero continued as Computer Science Deputy with Lt Colonel Preyss serving as the Astronautics Deputy. Major Jerry Smith was Deputy Head for the ERCC during this period. The Guidance and Control Laboratory supported cadet and faculty research and instruction of Astronautics courses. All faculty members were involved in acceptance testing for the new Burroughs B-6700 computer in the ERCC which was installed in July 1972. Acceptance was based on proper handling of simultaneous inputs from six terminals. The department began a full system test in July, but after a long series of failures, discontinued testing in September. At that point, it was clear that the computer would not live up to the manufacturer's expectations. Further modifications were made throughout the winter, and testing was resumed in April 1973 with full acceptance of the system completed in May 1973.

Colonel Wittry was appointed a Permanent Professor in 1973 and was supported by Lt Colonel Edward J. Bauman who served as Deputy Head for Astronautics, and Lt Colonel Clifford J. Trimble as Deputy Head for Computer Science. The department offered two majors, one in Astronautical Engineering and one in Computer Science. The core Astronautics course reintroduced contract grading to the Academy

during that year, which provided many benefits to both students and instructors.

The Class of 1975 was the last to have the opportunity to participate in the cooperative graduate degree program. The department expanded its "hands-on" approach to instruction during this year in order to enhance the cadet transition from theory to hardware operations. With this goal in mind, a new course was offered entitled "Aerospace Flight Simulation." The course was designed as an introductory and interdisciplinary course integrating pilot response to the dynamics of an aerospace flight simulator. A T-38 combat simulator driven by a PDP 11/45 computer was installed in the Guidance and Control Laboratory as the "hands-on" equipment for the course. Another example of "hands-on" engineering was a course offering entitled "Aerospace Vehicle Systems Design." In this course, the cadets designed, constructed, and flight tested a recoverable small scale instrumented rocket. Colonel Wittry continued as Head of the department with support from Lt Colonel Eldred D. Merkl, Deputy Head for Astronautics; Lt Colonel Bauman, Associate Head for Research and Curriculum Development; Lt Colonel Trimble, Deputy Head for Computer Science; and Lt Colonel Jerry Smith as Deputy Head for the ERCC. There were no substantial changes in the department curriculum offerings in 1975, except for deletion of the 500 level graduate program.

In 1976, the significant course changes in DFACS occurred in the core curriculum. During the spring semester, Computer Science experimented with about 20% of the core students trying the self-pace system using a minimum pace lecture. The regular classes eliminated machine language. The change from CS 200 to CS 100 required that twice as many students, both the 3rd and 4th classes, had to be taught without increasing the academic staff or resources. As a result, night laboratories became necessary. The core Astronautics course replaced graded homework with a larger number of quizzes. Two sections of Astronautics core were

used as experimental sections for a new course entitled "Engineering Systems Design," core for the Class of 1980. This experimental course involved the core student with the actual design, construction, and testing of a complex system. The course was modeled after the Astronautics major design course to determine how well the general student could perform with his engineering core background. The course was an unqualified success. The department continued to offer majors in Astronautical Engineering and Computer Science and a new major in Aviation Sciences, as interdisciplinary major administered by the department.

In 1977 Lt Colonel John A. Zingg became the Deputy Head for Advanced Computer Science, and Major Lawrence E. Druffel became the Deputy Head for core Computer Science. Lt Col Thomas J. Eller became Deputy Head for core Astronautics but was succeeded by Major Robert B. Giffen when he was appointed an assistant Dean in October 1977. Three majors were continued by the department. The core Computer Science course was reoriented toward general computer science literacy. It was also changed to a double period to accommodate laboratory class time in lieu of graded homework. The core Astronautics course reverted to a contract grading system in the spring and a class design project was introduced into the curriculum. In December, a long-term project was approved involving the Academy in a project to build a small selfcontained payload for an early Space Shuttle flight. These experiments will be designed and built by cadets. The DFACS will integrate the experiment with support from other departments. The Seiler Laboratory will fund the Space Shuttle project cost. Since this will be a long-term project, involving the Academy and several other units, in addition to the NASA, a project name SCENIC FAST was selected to identify the effort.

In November 1978, Colonel Wittry was named Vice Dean of the Faculty. Lt Colonel Bauman assumed the role of Acting Head. The department continues to offer three majors and is currently evaluating courses for possible improvements.

Research Contributions

The department has been continuously involved in supporting operational Air Force requirements. Some early projects included studies and analysis of tactical aircraft and missile engagement, simulation of human eye movement and optimal control problem studies. In addition, work has been done in orbital trajectory studies, development of a list processing language, and wind tunnel data reduction techniques. More recently, a study was conducted for the Space Transportation Division at the Space and Missile Systems Organization (SAMSO) concerning design of the orbital shuttle vehicle. A major effort early in the departmental history was the C-130 gunships project. This project involved several officers in the department and supported the development of that system. Also, the department directed the development of a fire-control system for the F-106 and a new gunsight for combat aircraft. Airborne system development in conjunction with the Air Force Avionics Laboratory and the Flight Dynamics Laboratory is currently an active program, in addition to satellite system studies for the Global Positioning Satellite Program Office at SAMSO. The Satellite Data System is another SAMSO program receiving regular research support. And one member of the department completed a major review of the SAMSO test and evaluation architecture during a summer consulting assignment. In the Computer Science area, research was supported in such areas as F-16 fiscal program software development, Over-the-Horizon Radar system analysis, and new computer language studies. A team also published a "Data Administrator's Handbook" in 1976 which is now in use across the country. Many other such contributions are being made on a regular basis, supporting many important Air Force missions.

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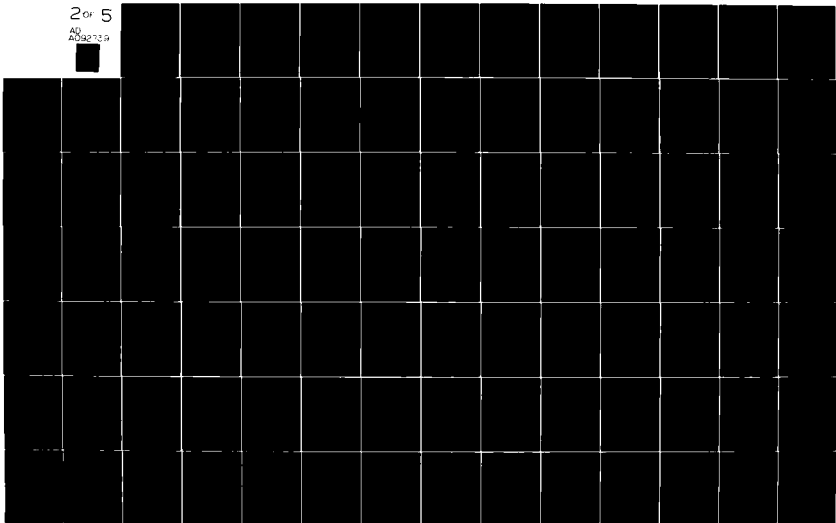
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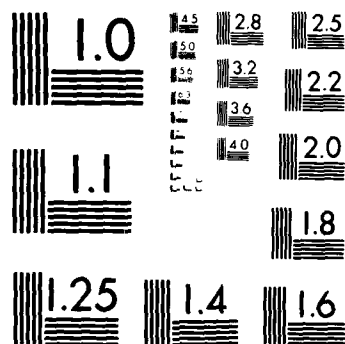
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Future Plans and Programs

The Astronautical Engineering and Computer Science curricula continue to be scrutinized. Both sides of the department have convened well-attended conferences where details of course worthiness were discussed from an Air Force operational utility viewpoint. Much was learned from these forums, and several areas are programmed for enhancement, including propulsion and aerospace structures for Astronautics and a significantly reviewed program in Computer Science.

In the area of design, our Engineering 430 course, "Engineering Systems Design," will enter the core curriculum next fall, significantly enhancing the integration of the engineering education predominant here at the Academy.

New analog computers in the laboratory, new applications of our T-38 cockpit simulator and other carefully selected additions to our curricula will seek to enhance our currently strong disciplines. A new curriculum direction for Computer Science will emphasize a three-track major in areas of system software, scientific, and management applications.

Conclusion

In short, much has been accomplished in our first twenty-five years, but much remains to be done. The contributions of our department in the areas of astronautics and computer science have been significant Air Force wide. The new threshold of space has demanded our support in the past and will require it in the future. Astronautics and Computer Science majors will continue to graduate and receive their commissions to take their places beside the many who have graduated earlier. Their contributions will be even more nationally significant than those of the past, for the spearhead of technology must move forward into new realms in man's continued quest for answers to age-old questions.

CHAPTER 6

THE EVOLUTION OF THE DEPARTMENT OF CIVIL ENGINEERING, ENGINEERING MECHANICS AND MATERIALS*

Outwardly the Department of Civil Engineering, Engineering Mechanics and Materials bears little resemblance to the Department of Mechanics of twenty-five years ago. The department has grown from a handful of dedicated officers offering three core courses in drafting, statics, and dynamics to a multidisciplinary corps of forty-five officers offering thirty-four courses in every major aspect of civil engineering, mechanics and materials. The number of academic majors offered by the department has evolved from zero to four complete disciplines of study in civil engineering, engineering mechanics, engineering science, and engineering. Similarly, the current research programs and laboratory facilities have little resemblance to those of those twenty-five years ago. Since its inception, all aspects of the department have undergone major changes, with two exceptions: the common threads binding twenty-five years of change are the wholesale endorsement of the overall mission of the Academy and the dedication of its officers in support of that mission.

The early development of the department occurred under the guidance of Brigadier General Archie Higdon (USAF,

*Captain Dale K. Carter, Instructor of Engineering Mechanics, provided this information.

Ret.), permanent professor and department head until 1965. Under his leadership, the Department of Mechanics developed three core courses and a small number of enrichment courses encompassing the basic elements of engineering mechanics: drafting, statics, dynamics, and strength of materials. Perhaps his greatest contribution to the department was his emphasis on both the academic and the professional development of the cadets, an attitude that remains a department tradition today. A major milestone in those early years was the accreditation of the Engineering Science major by the Engineers' Council for Professional Development in 1962. During the same period of time, the course offerings were expanded to include advanced undergraduate courses in descriptive geometry, statics, dynamics, strength of materials, materials science, and structural analysis and design in addition to the three basic core courses. In 1962, a move was made to introduce a limited number of civil engineering courses in order to be more responsive to the Air Force requirements for civil engineers. A new major in Civil Engineering was introduced in 1964 and the Engineering Mechanics Department developed a civil engineering division consisting of six officers offering seven civil engineering courses. When Colonel Philip Erdle was named department head in 1965, the department introduced the Engineering Mechanics major and expanded its course offerings in material science and civil engineering. The next year, the civil engineering division became a separate department first headed by Colonel Winston Fowler and then in 1968 by Colonel Wallace Fluhr. The department assumed its present form in 1973 with the merger of the Engineering Mechanics and Civil Engineering Departments under the leadership of Colonel Fluhr.

Through the years, the department has developed three accredited disciplines of study in engineering science, engineering mechanics, and civil engineering and a nonaccredited engineering major. The Engineering Science major

provides cadets with a broad engineering background and an understanding of the interrelationship among the engineering disciplines by requiring advanced course work in aeronautics, astronautics, electrical engineering, and engineering mechanics. This challenging major places a heavy emphasis on engineering design, allowing cadets to choose among design sequences in several specialties. The Engineering Mechanics major provides cadets with an excellent engineering background with emphasis in the areas of mechanics, aircraft structures, and materials. It also emphasizes engineering design and allows some specialization in the areas of structures, materials, or dynamics. The Civil Engineering major provides cadets with a balanced program in the various fields of civil engineering with emphasis in structural design. The program is specifically tailored to provide cadets with the skills in base engineering and facilities design and construction that they will need as Air Force officers in the civil engineering career field. The nonaccredited Engineering major is designed for those cadets who desire a basic engineering background without specialization in any particular discipline. The major permits a wide selection of options from among the various engineering departments.

Perhaps the most significant aspect of the department's evolution is the development of the core courses it offers. Originally the department's core courses included Mech 321, *Engineering Drawing and Descriptive Geometry*; Mech 331, *Statics and Dynamics*; and Mech 332, *Statics and Strength of Materials*. All three courses were analysis-oriented, concentrating on the mechanics of problem-solving. These core courses remained essentially unchanged until 1967 when they were replaced with Mech 120, *Engineering Fundamentals*. The new course was originally designed to contain the essence of the engineering graphics, statics, and dynamics subjects contained in the three courses it replaced. Eventually the emphasis on graphics and detailed problem solution techniques was dropped and was shifted to provide a basic

understanding in statics and dynamics and a brief introduction into the various engineering disciplines. With the shift in emphasis, the course was redesignated Mech 110, *Introductory Engineering Mechanics*. The evolution of the Mechanics core continued in 1977 with the development of Mech 210, *Engineering Materials*. The new core course was designed to fill an Air Force need for all cadets to have a basic understanding of the importance of engineering materials to the mission of the Air Force. The course provides an introduction to strength of materials and the treatment, properties, and use of engineering materials and exposes cadets to the basics of engineering design. In summary, the mechanics core has evolved from a detailed presentation of problem solution techniques tailored to engineering majors to a more basic summary of the educational background required in practical engineering analysis and design. While still providing engineering majors with a sound basis for further study, the current core offerings provide all cadets with a more balanced understanding of the engineering aspects of today's Air Force.

The organization, majors, and core offerings of the Department of Civil Engineering, Engineering Mechanics and Materials have changed extensively over the years to meet the changing requirements of the Air Force. The future evolution of the department will continue to reflect those requirements. Whatever the future holds, the department will remain, as it has since its inception, dedicated to the academic and professional development of future Air Force officers.

CHAPTER 7

THE CIVIL ENGINEERING CURRICULUM AT THE AIR FORCE ACADEMY*

The Air Force operates a variety of installations throughout the world as part of the overall defense of America. These installations may include runways, radar towers and antennas, missile silos, underground command posts, communication networks and research facilities. In addition to these mission essential facilities, each installation generally includes personnel housing, commissaries, base exchanges, aircraft hangars, fire stations and other facilities for maintenance activities, personnel administration and recreation. Designated Air Force personnel are responsible for the design, construction, and routine operation and maintenance of this wide variety of facilities. The officers and personnel who are given these responsibilities are assigned to the Civil Engineering or 55XX career field.

Today's Air Force civil engineer faces many new challenges. Highest on the list of challenges is the need to operate an Air Force installation with fewer material resources and with better utilization of personnel resources. An integral part of the management of personnel is the need to provide them with a pleasant environment in which to work. In addition, greater emphasis is being placed on providing comfortable living facilities for the Air Force family and on providing an air base which is compatible with the local civilian

*By Colonel W. E. Fluhr, Permanent Professor and Head, and Lieutenant Colonel D. D. Piepenburg, Tenure Associate Professor.

community. To meet these goals, the Air Force needs officers who can continue to provide efficient designs, insure timely construction of facilities and accomplish the operation and maintenance of the air base complex. To meet the requirements associated with effective personnel management and providing a community environment compatible with the needs of the Air Force personnel and the local citizens, it is imperative that all Air Force officers understand the air base environment. Any officer in the capacity of the base civil engineer, base operations officer, or base commander must be prepared to develop and defend environmental impact statements. This need has been identified as one of the goals in the Academy's fifteen year plan: "To emphasize the inherent interdisciplinary nature of knowledge and the interrelation of traditional academic disciplines and ecology in the application of knowledge to the management of Air Force resources and problems."¹

To meet the Air Force's need for career oriented civil engineering officers, special courses in civil engineering were introduced into the Academy curriculum during the academic year 1962-1963. A single enrichment course in the design of engineering structures was offered by the Department of Mechanics in the fall semester. During the spring semester, two additional courses were offered in experimental stress analysis and in engineering design and nuclear weapons effects. The following year saw some changes in course content but no additional courses were offered to the cadets. However, during this time a curriculum change introduced a full scale civil engineering major to be offered for the first time in the fall semester 1964.

As stated in the historical documents for 1963-1964, "The purpose of the civil engineering major is designed to provide

¹ USAF Academy Fifteen Year Objective Plan, 1978-1992, Hq USAF Academy, Colorado, May 1978, p. 18.

the cadet with a broad base of knowledge and understanding of diverse activities as confronted in the military service."² The first cadets to complete the civil engineering major graduated in June 1966. Since then 603 cadets have earned Bachelor of Science Degrees in Civil Engineering.

Throughout the first twenty-five years of the Air Force Academy, emphasis has been placed on providing the cadet with a general education. Even when majors programs were added to the curriculum this emphasis remained. Graduates were still required to complete a series of courses in basic sciences, engineering sciences, humanities and social sciences. They were permitted to devote approximately twenty-five percent of their time completing courses in a chosen area of emphasis. Because the civil engineering officer had to be knowledgeable in a wide variety of areas, cadets declaring that major were required to complete courses in surveying, hydraulics, material sciences, statics and dynamics, structural analysis and design, and soil mechanics.

Approximately seventy-five percent of all cadets completing the civil engineering program have entered undergraduate pilot training immediately upon graduation. Almost all of the remaining twenty-five percent (10 to 15 cadets each year) have entered the Air Force civil engineering career field. For the past fifteen years the program has prepared its graduates to serve in various capacities as designers, operations and maintenance officers, and planners within the base civil engineering organization.

The curriculum emphasis has been on preparing the graduate to be a structural engineer to provide facilities required to operate air bases and the structures capable of withstanding enemy nuclear attack. Although it would have been desirable to give cadets a broad background in such

²"History of the United States Air Force Academy," Historical Division, Vol 1, Document 17, 1 July 1963-30 June 1964.

areas as hydrology, transportation, and pavements engineering, it was concluded that insufficient time existed in the cadet curriculum to include all of the special areas associated with civil engineering. Structural engineering was selected for emphasis because the Air Force has very large quantities of financial resources dedicated to the design, construction and maintenance of its physical plants, and because of the critical nature of structures in the protection of weapon systems.

The current academic curriculum completed by cadets majoring in civil engineering continues to be a demanding program. The courses in mathematics, chemistry, physics, mechanics, management, economics, psychology, behavioral science, history, law, leadership, and English provide the necessary fundamentals for a broad general education. They also provide an introduction to leadership, management, and self expression which permits the civil engineering officer to effectively manage his work force. Engineers are responsible for developing adequate designs, assuring accurate construction, and reliably operating and maintaining a wide variety of facilities. Consequently, students who desire to earn a degree in civil engineering must demonstrate an understanding and ability to apply and build upon the engineering fundamentals taught in the core courses.

The civil engineering curriculum continues to require courses in dynamics, structural analysis and design, soil mechanics, hydraulics, and construction engineering. With the current need to provide graduates with a better understanding of the total environment in which an air base must operate, more emphasis is being placed on the need for cadets to select optional course topics in foundation engineering and environmental engineering. The topics taught in these courses better prepare graduates to solve problems associated with providing runways for high performance aircraft and adequate treatment of water and wastewater.

In addition to the courses taught to those cadets majoring in civil engineering, all cadets at the Academy receive a brief

exposure to civil engineering through lectures in Mechanics 110, *Introductory Engineering Mechanics*. The principal purpose for presenting these special lectures is to make cadets aware of the types of problems commonly faced by the civil engineer and how they, as future operations officers and base and wing commanders, may be involved in solving these problems.

To further support the Academy's five year objective of interrelating the traditional academic disciplines and ecology, the department now offers a three-credit-hour course, *Air Base Engineering* (CE 481). This course is part of the Human Factors Engineering Program offered by the Department of Behavioral Science and Leadership. A few cadets majoring in engineering, basic sciences, or civil engineering complete this course along with the twenty or more Behavioral Science Majors each year. The course is taught with the base commander in mind and covers topics related to organizing for the planning process, inventory of the air base and surrounding urban area, forecasting demand, analyzing constraints, and finally, synthesis of the above into the design of an air base. This course has been extremely successful and shows signs of increased enrollment. No other course relates more closely to the actual planning and operation of an Air Force installation.

The Air Force continues to experience shortages in officers qualified to serve in the civil engineering career field. It is not possible to meet all of the Air Force manning needs in this area with Academy graduates. Because of the demand for civil engineering graduates in our society as a whole, long-term retention of civil engineering officers in the Air Force poses a very serious problem to the Air Force in the future.

To further the long-range Academy objective of relating traditional academic disciplines to the management of Air Force resources, several civil engineering officers anticipate being able to participate in Engineering 430, *Engineering*

Systems Design. Numerous topics in the field of civil engineering, which would be within the solution capabilities of seniors, are available. Many projects would address improving the living and working environment at many of the Air Force installations throughout the country, accomplishing environmental impact statements associated with base expansion, changes with the operational mission of air bases, and developing better relationships with a local civilian community.

In summary, the Air Force needs civil engineering officers to operate and maintain its vast array of air bases and facilities. The Air Force needs civil engineering officers to provide the design and construction of protective structures for future weapon systems. The Air Force Academy program has definitely provided its graduates in civil engineering with the necessary knowledge and experience to perform in an outstanding manner in this critical area. The entire Academy faculty can take great pride in the quality and motivation of our graduates serving in the civil engineering career field of the Air Force.

CHAPTER 8
ENGINEERING MECHANICS
AT THE
UNITED STATES AIR FORCE ACADEMY*

Introduction

The primary purpose of the academic curriculum at the United States Air Force Academy is to give every cadet a broad general education that will serve as a base for progressive development as a career officer in the United States Air Force. Since the first cadet entered the Air Force Academy in the summer of 1955, Engineering Mechanics has played a key role in the prescribed core curriculum by providing an introduction to engineering fundamentals. In addition to the prescribed core curriculum, the Academy has added programs of elective courses which began as an "Enrichment Program" and later evolved into an excellent majors-for-all program. In 1967, the major in Engineering Mechanics was first accredited by the Engineers' Council for Professional Development.

Both the core curriculum and Engineering Mechanics major have slowly changed over the years, but more important are the changes in philosophy which have guided those changes. This paper records and discusses these changes in philosophy.

*By Colonel W. E. Fluhr, Permanent Professor and Head, and Lieutenant Colonel E. A. Osborne, Tenure Associate Professor.

The Role of Engineering Mechanics in the Core Curriculum

The one constant of the academic curriculum at the Air Force Academy has been the goal to provide all cadets with a strong, broad, general education. This general education has been provided through a large core curriculum which is balanced between the humanities, social sciences, basic sciences, and engineering sciences. This broad program has given our graduates the flexibility to adapt to the variety of assignments inherent in an Air Force career.

Almost every Air Force officer will many times have to deal with some aspect of weapons system problems which will involve engineering solutions. The core curriculum has contained courses from the engineering sciences because the Academy believes that every cadet should have an idea of the technical problems inherent in the Air Force, and secondly, that every cadet should have an appreciation of the engineering method which will be used to solve those problems associated with the design, development, and procurement of modern weapons systems. The goal of the engineering method is not merely to understand the physical problem or environment but to produce a system for a specified useful purpose.

The key to this engineering method is the design process which may be broken into four major stages:

1. Identify the need and/or define the problem.
2. Conceptualization—The generation of alternative possible solutions.
3. Analysis—For each proposed system:
 - a. Formulate an idealized model,
 - b. Develop a mathematical description of each model using physical laws,
 - c. Solve the mathematical equations, and
 - d. Test and evaluate the solution.
4. Produce and deliver a usable system.

Engineering mechanics and materials selection play important roles in the design of any physical system and as a result these topics have been included in the engineering science core at the Air Force Academy.

The initial all-core curriculum at the Academy contained three required mechanics courses: engineering drawing and descriptive geometry, statics and dynamics, and strength of materials. These introductory courses in engineering fundamentals focused on the analysis stage of the design process and have traditionally been required courses for beginning engineering students at all colleges and universities. They were very definitely designed to teach a student "how" to solve problems in engineering analysis.

A requirement for each cadet to complete an academic major was instituted at the Academy in 1964. This requirement caused two major changes in the role of engineering mechanics within the core. The first and most obvious change was that by the fall of 1966 the Department of Mechanics had only one core course—statics and dynamics. The second change resulted from a self-evaluation of the proper role of that mechanics course in the core curriculum.

Engineering mechanics courses for beginning engineering students traditionally concentrated on "how" to solve analysis problems, and it was assumed that if a student was studying engineering and knew how to solve a problem, that he or she had an automatic appreciation of "why" solving it was important. This assumption clearly required some modification in developing a common engineering core course for humanities and social science majors as well as engineering majors. In response to this requirement, the department returned to the fundamental design process, emphasizing both the "how" and "why" of engineering.

At the same time, several civilian engineering schools were beginning to recognize a need for the "why" of engineering to attract and keep freshmen engineering students. The response at these schools was to add a freshman survey course on the role of engineer and the engineering method and to

keep the traditional engineering fundamentals courses. This was not a suitable solution as a core course for non-engineering students at the Academy.

In the fall of 1967, the Department of Mechanics introduced a new course in engineering fundamentals which retained some of the "how" from a traditional course in statics and dynamics and added material on the "why." Included were lessons on the application of engineering fundamentals to Air Force problems, discussions of the various engineering disciplines, and completion of a design problem.

Within a few years, it became apparent that while the department had developed a good introductory course combining the "how" and "why" of engineering fundamentals, there was a topic of growing importance to the Air Force that needed to be included in the core program: engineering materials. New words such as corrosion, creep, fatigue, and fracture were becoming a part of every Air Force officer's vocabulary, and the Department of Civil Engineering, Engineering Mechanics and Materials believed that our graduates had to be able to appreciate and comprehend the cause and prevention of Air Force problems described by these words.

During the Air Force Academy's "Twentieth Anniversary Study" in 1975, the Academy decided to revise the core and include a second core mechanics course, engineering materials. This second course now enables the department to bring the "how" and "why" of engineering to a full circle. In the first course in engineering fundamentals, the department is able to discuss the role of engineering in the Air Force and teach the basics of statics and dynamics. In the second course on engineering materials, the department is able to use skills learned in the first course to discuss response of materials to loading and how the structure, properties, and treatment of materials affects the response. The culmination of this two-course sequence is a series of design projects in which various proposed solutions to actual

Air Force problems are analyzed and evaluated. The non-engineering student leaves this two-course sequence with an appreciation for both the complexity and soundness of the engineering method. On the other hand, the student who plans to major in engineering has a better understanding of his or her future role as an engineer plus useful basic skills in analyzing problems in statics, dynamics, strength of materials, and materials science.

The Engineering Mechanics Major

The major in Engineering Mechanics was introduced in the fall of 1965 and first accredited by the Engineers' Council for Professional Development in 1967. The major was designed to provide a broad base of knowledge in engineering fundamentals with depth in the areas of dynamics, structural mechanics, stress analysis, and materials engineering.

The major was primarily theoretical in nature and designed to provide a foundation in engineering mechanics for further formal education in a variety of engineering specialties. It contained only two design courses since its direction was to provide a broad knowledge of engineering fundamentals. By 1970, students were offered a choice of three different four-course sequences in stress analysis, dynamics, or materials; and students felt that they had an area of specialization.

The major remained fairly constant until the fall of 1975. That fall, the department was teaching two intermediate-level structures or stress analysis courses—Advanced Strength of Materials for Engineering Mechanics Majors and Introduction to Aerospace Structures for Aeronautics Majors. Both courses covered basically the same material, one in a theoretical sense and the other with applications to aircraft. Since more than 75% of our graduates go on to pilot training, it seemed obvious that the department could increase student interest and be more efficient by consolidating the courses into one course in Aircraft Structural Analysis.

That same fall, the Air Force Academy's "Twentieth Anniversary Study" recommended a change in the academic load from seven courses per semester to six. Every major would be reduced from seventeen courses to eleven courses.

How could the department continue a broad-based major in the areas of structures, materials, and dynamics and still provide meaningful design courses at the same time? The answer was found in aircraft structures. No other structure provides the engineer with as many design challenges in the areas of stress analysis, dynamics, and materials. In addition, many of our graduates and instructors will serve or have served in aircraft structural engineering career fields.

The resulting major for the Class of 1980 and subsequent classes was a program unique to the Air Force Academy, a true applied engineering mechanics program with equal emphasis on stress analysis, dynamics, and materials but also one guided by the needs of an Air Force aircraft structural engineer. This new program gave a unified direction to our fundamentals courses, a clear goal for our new and expanded design courses, and a graduate ready to meet Air Force needs.

CHAPTER 9

ON THE ROLE OF ELECTRICAL ENGINEERING IN THE CORE CURRICULUM*

The purpose of the academic curriculum at the United States Air Force Academy is to give every cadet a broad general education and an opportunity to earn a major in a discipline or field of his choice. This general statement by no means provides all the guidance needed to design that part of the core curriculum devoted to electrical engineering. I would like to expand upon the relevancy of electrical engineering to general education and hopefully to articulate the philosophy that has guided the continuing development of this discipline as an element of general education at the Air Force Academy.

A hallmark of our program has always been the balance between humanities, social, basic and engineering sciences. But the balance is not to be measured by simply adding up the semester hours devoted to each field and noting that there is a pro rata share for everyone. The degree of balance is better measured by examining the insights and outlooks of the cadets who are exposed (or subjected) to the curriculum. Do they in fact see the merit of a general education? Moreover, do they see the relevance of each of the elements of general education?

What are these qualities? At times the qualities we seek in our students seem easier to recognize than to define. They

*Adapted from an earlier version of this paper by Brigadier General Roland E. Thomas (USAF, Ret.), formerly Permanent Professor and Head of this department.

are more evident by their absence than by the presence; perhaps because it is often easier to perceive their absence than their presence. But let me offer the suggestion that the product of a general education is a person who is "literate," "numerate," and "articulate;" and who has sought excellence in one or the other of the first two qualities.

To expand upon this definition, I suggest that the purely literate man has been trained to sift truth, meaning and value from words. Language is his basic tool and his background includes literature, history, politics, and economics. The purely numerate man is accustomed to sifting truth, meaning and value from observation of the physical universe. Number systems are his basic language. His background includes mathematics as well as scientific theory and practice. By articulate, I mean a person who is able to express ideas clearly and effectively using either words or numbers, or words and numbers. Finally, the educated person must have sought excellence in either numeracy or literacy. I say one of the qualities because it seems to me that numbers and words are quite different media for refining truth, meaning and value. To pursue excellence in one or the other seems to require a special bent of mind. Rare is the person who can be both a first class novelist and a first class computerist.

I do not esteem the one quality and depreciate the other; I do not suggest that they are opposites but only that they are different. I believe that an undergraduate education must offer both literate and numerate experiences but must also offer the opportunity for the student to push himself to the limits of his ability. When the student seeks excellence, then and only then is his bent of mind a special consideration. To put it another way, a modern general education curriculum must have a balance, both a viable core curriculum and an excellent majors program.

What role does electrical engineering play in all of this? Obviously our primary role is to be found in the numerate area but we interpret this role in several different ways. Our

major offers an opportunity for cadets with the talent and desire to seek excellence in electrical engineering. Several of our enrichment courses enhance the numerate education of cadets seeking excellence in other fields of science and engineering. Finally, we teach two core courses. I would like to confine the remainder of my remarks to these courses, for they represent the major responsibility of the department.

Let us recognize at the outset that in the core courses we teach a subject which is inherently numerate to an audience that is primarily of a literate mind. Moreover, electrical engineering inherently uses mathematical abstractions to a greater degree than any other physical science. Additionally, the average cadet's perception of our discipline is both limited and naive. These factors, together with the size of these courses, make teaching electrical engineering in the core uniquely challenging.

Our problem is compounded by the rapidly changing nature of our technology. The ubiquitous integrated circuit chip has turned the world of electronics upside down. Over the last fifteen years the development of semiconductor electronics has increased the information processing power available per dollar by a factor of about a million. No other technological innovation, not even nuclear weapons represents so vast a change in so short a time. Moreover, there is considerable evidence to suggest that this trend will continue unabated for the rest of this century. Our present microcomputer resources are up to date and represent an improvement of several orders of magnitude over our capability a decade ago. Yet a decade hence these resources will be but quaint artifacts.

So we must do more than simply run before the winds of change. We must search for constancy in the midst of change. We must set our sails and tack so that the winds of change will drive us towards our goals. To do this we must anticipate change, identify our goals, and relate them to the needs of our cadets as future professional officers and members of

contemporary society. In short, our efforts must be guided by some undergirding philosophy.

Now I recognize that there may be something rather portentous about a "philosophy of electrical engineering." Yet, I think it is important to articulate our aims recognizing full well that such a statement of purpose will not produce a wonder drug to cure all our ills. What is needed is not a philosophy, as much as it is

- a. a clear set of goals,
- b. a department membership that is informed about these goals, and
- c. a sense of strategy and spirit in the department's approach to these goals.

The establishment of goals for the core courses in electrical engineering must consider many factors, especially (1) the subject itself, (2) the needs and interests of the students, and (3) the activities that they can reasonably be expected to perform in the Air Force. Regarding the first two factors I would return to the notion that electrical engineering is an intensely abstract, numerate subject while our students are of a literate mind with naive preconceptions of our subject. They are more inclined toward issues rather than methods. They are more inclined to ask why, rather than how. On the other hand, our subject traditionally emphasizes the how. How do you establish the Q-point of a transistor? How do you determine the bandwidth of an RC coupled amplifier? We tend to tacitly assume that if the students know how to do these things they will somehow automatically appreciate why they are important. I suggest that in the core courses this assumption is fallacious. To this audience we must emphasize the why as well as the how.

Regarding the third factor above, I believe that it is unlikely that many students in the core courses will function as electrical engineers in the Air Force. Deal with electrical

engineers? Yes. Grapple with the impact of electronics on weapons technology? Most certainly. But not in the role of electrical engineers. They will not need the skills of the electrical engineer as much as they will need to understand his role and viewpoint.

With these thoughts in mind, let me define goals, or if you prefer, philosophical tenets. There will be four in number.

I

The core courses should provide an understanding of the application of the engineering method to electronic systems.

At the risk of being pedantic, I note that electrical engineering is engineering. We cannot remove the engineering content of these courses and have a subject to present as a legitimate part of the academic curriculum. But lurking in the background there remains the questions—what then is the unique nature of electrical engineering and what is the nature of the engineering method?

To my mind, electrical engineering deals with systems which process two basic commodities: energy and information. This definition then divides the study of electrical engineering into two broad areas: (1) information systems and (2) energy systems. The impact of integrated circuit technology and the attendant Air Force applications strongly suggest that the emphasis in the core courses should fall on information systems. Among the things this implies is that we must treat information as a engineering commodity and the flow of information within an electronic system as the reason for its existence. We should not discuss such things as the bandwidth of a filter or the fanout of an AND gate unless it is clear that our underlying concern is the information handling capacity of these circuits.

Now the engineering method has a number of formulations, almost one for every person who has thought seriously about this matter. At the risk of joining the legion of thinkers who have shed more heat than light on this subject, I offer my version of the engineering method. The method is above all a way of solving problems which arise in the physical world. The primary medium of exchange of ideas are numbers and mathematics, thus characterizing electrical engineering as a numerate field of study. I suggest the existence of six steps in my version of the engineering method:

- (1) Definition of a requirement for a system to perform some useful function within certain resource constraints.
- (2) Synthesis of a candidate system which seems to have a reasonable chance of meeting the performance requirements with the constraints.
- (3) Formulation of a mathematical description of an idealized model of the candidate system.
- (4) Solution of the system of equations derived in step (3).
- (5) Evaluation of the performance of the model of the candidate system from step (4) with iteration to step (2) if necessary.
- (6) Construction and testing of the candidate system with iteration to step (2) if necessary.

I make no claim regarding the uniqueness nor completeness of this formulation. Neither do I claim that specialists in other fields would be well advised to apply this method to their problems. I do, however, claim relevancy of these thoughts to electrical engineering. In point of fact, what really matters is not the formal steps listed above but the goal of the method—to produce a system for some stated, useful purpose within given resource constraints. That is, the goal of engineering is not merely to understand the physical world but to design and build systems which alter or control the physical environment.

From my experience teaching electrical engineering, I suggest that there is a strong temptation to focus all too brilliantly on steps (3) and (4) of this process. Let us not mince words, this is where "plug-and-chug" creeps in. To put it another way, steps (3) and (4) are almost exclusively concerned with how. The why of electrical engineering is concentrated in the steps at either end of the list.

I do not downgrade any of the steps in the method, I simply feel that they all deserve emphasis. This task is formidable, to be sure, but fortunately our own technology has come to the rescue. An electronic world dominated by chips is a world dominated by digital systems. As a result the applications of classical linear circuits, the big contributors to the "plug-and-chug" syndrome, have been driven to the periphery of the system. For example, the first core course in electrical engineering is now "all-digital" and almost no time is devoted to steps (3) and (4). Our first course now concentrates on the first and last two steps in the method, the more interesting and challenging "why" part of the process.

The domain of digital integrated circuits is dominated by design rather than analysis considerations. In this regard it is important to distinguish between the "design of" and "design with" integrated circuits. The former (design of) requires the ability to deal with large-scale circuits, with an attendant emphasis on computer aided circuit analysis and design. The latter (design with) basically involves the interconnection of standard commercial assemblies. Design in this context normally involves only relatively simple circuits that are by necessity located at the boundary between chips, that is, the system interfaces.

What seems clear at this time is that the core courses should attempt to develop the viewpoint and the skills that will ultimately lead to some ability to design with integrated circuits. This means that our methodological focus will be driven more and more to the interfaces between larger and larger aggregations of circuits. This trend is already well

underway and seems destined to accelerate in the future. Our digital core course is already aimed in this direction, but has perhaps not yet moved far enough. Our second core course now contains all of our coverage of analog systems, and we are now only beginning to see how this course can be organized to reflect the impact of integrate circuits.

II

The core courses should acquaint the cadet with the viewpoint and terminology of electrical engineering.

An understanding of the engineering method applied to electronic systems should lead the cadet to an acquaintance with our viewpoint. We have been rather successful in applying this method to systems that have had a very great impact on the Air Force. Cadets should gain some insight into the elements of problems we think are important. If you will, they should gain some feeling for our world view and thereby expand their own.

Terminology (or our use of language) causes us more problems than I think we recognize. Remember that the students in the core courses are inclined to subjects in which the primary medium of exchange of ideas is words. Our primary means of exchange is numbers, and we tend to use words in rather narrow and unemotive ways. Additionally, our exploding technology forces the introduction of a bewildering lexicon of new terminology. For example, CHIP, DIP, MOST, OP AMP are part of our everyday vocabulary. Therefore, our language may seem both unexciting and confusing to students accustomed to handling words in quite different ways.

For example, the following passage is one possible description of an AM-FM receiver:

Bogan's finest receiver! Offers a powerful 70-watt output, brilliant stereo FM reception, top-quality AM performance, plus a non-compromise preamp with a vast array of controls for every stereo or mono source. D'Arsonval signal-strength meter and automatic stereo switching for perfect tuning of any station in seconds.

An alternate description could read something like this:

Power: 70 W, Response: \pm db, 20-500 000 Hz, Usable FM sensitivity: $2.3 \mu\text{V}$, Harmonic distortion: less than 0.5%, Stereo FM separation: 38 db at 1 kHz, Output: 4, 8, 16 Ω , 4 5/8" x 16 1/4".

My point is that these are two contrasting ways of describing the same piece of equipment.* We are inclined, by education and experience, to the second description, whereas our students may be inclined, for much the same reasons to the first. We should recognize and point out that this difference does exist and that this is part of our point of view. We should try to convince our students that there is merit and information in all those numbers, hence merit in our point of view. At the same time we should acknowledge that there is merit and information in the first description. In other words, we are not trying to convert them to our viewpoint, we are trying to help them understand it. To do this, we must understand our viewpoint and theirs.

III

The core courses should provide some perspective on the impact of electronics on weapons technology.

We recognize that electronics is important because we see it used all over the place. But we are electrical engineers and

*Actually these two descriptions we obtained by dividing a passage in the *Allied Radio Catalog* into two parts.

we know something of our history. We also know a good deal about current technology and are able to make some reasonable guesses about the impact of technology in the future. In sum, we have engineering perspective.

What do I mean by perspective? Webster defines perspective as the relationship or relative importance of facts or events from any special point of view. I suggest that the cadets have taken a number of other core courses in which the development of a perspective in that field is a major goal. For example, the core history courses are aimed at developing the ability to judge the relationship and relative importance of events in the past.

One thing that may help us in this matter is the occasional discussion of the history of electrical engineering. Our students are accustomed and indeed trained to see merit and importance in those things from the past that have impacted the present. For example, who invented the vacuum tube, the transistor, the integrated circuit? Was there any difference in the way these developments came about? What influence did military requirements have on the development of these technologies? I do not suggest that we teach a lesson on spark-gap transmission and its impact on the Battle of Jutland. But I do suggest that we have a history, much of which is relevant to the Air Force.

My point is that the development of perspective about electrical engineering requires some treatment of the past. For example, consider the following. To what extent did the President control (1) the first Battle of Bull Run, (2) the Battle of Midway, (3) the bombing of North Vietnam? In other words, what has been the role of electronic communication on the nature and control of warfare? Having thought through these questions, then, perspective might suggest a question something like this, "what would it take to provide the President with real-time television coverage (live and in color) of any future battlefield"? I am not suggesting that the core courses should prepare the cadets

to answer such questions, but only that the insight they get from our courses should lead them to ask such questions rather than "how do I fix an electric toaster."

We are dealing here with issues rather than methods. In helping our students learn to think meaningfully about issues we should guide them towards those issues that really matter. The ultimate purpose of developing perspective is to remove naivete and provincialism. There is enough of both of these qualities in our cadets and the Air Force. We should at least try to remove a little of each.

IV

The core courses should prepare the cadets for accelerating technological change and a world in which education must be a continuing process.

In the face of the twentieth-century explosion of knowledge, we can claim to have done our job only if the cadets have acquired the tools and especially the attitudes for continuing education. This means that we must place a premium on individual initiative and self-direction. We cannot achieve this goal if we create an environment in which the students can present themselves to be passively taught. Education is, in the final analysis, self-discipline.

Over the years we have experimented with various educational techniques aimed at enhancing the achievement of this goal, including self-paced numerical grading schemes. All of these experiments met with some success, but to a lesser degree than we had hoped and dreamed. What we have painfully learned is that Valhalla is not to be found through educational gimmickry.

If this goal can only be achieved through individual initiative and self-direction, then I suggest that we must move in the direction of placing greater reliance on the initiative and self-direction of the individual instructor. We must decentral-

ize the conduct of instruction in the core courses in order to capitalize on the quality and character of our faculty. Of course, greater instructor freedom carries with it the seeds of potential abuse. Yet, nearly twenty years of teaching experience convinces me that if we do not decentralize the core courses the sheer tyranny of numbers will continue to lock us into the "order-of-merit" and "what's-the-mean" syndrome. Surely a mature institution that is committed to excellence should be prepared to reach higher and risk more.

In advocating decentralization, I recognize that the faculty is our first, and only line of defense. In this regard I see storm clouds on the horizon. Through a confluence of many factors (the OER system*, reduction in graduate education opportunities, longer tours in specialized assignments, perceived erosion of benefits) it now appears that an Air Force career does not hold the attraction that it once did. As the personnel system has closed in on us, it has become increasingly difficult to attract and hold a quality faculty. At the very least it is clear that we must work much harder in the future on faculty recruitment and development. I suspect that in the future a Professor must be more of a mentor than an administrator.

I hope that I have painted a picture, and not a caricature, which shows the role and relevancy of electrical engineering in general education. It is a numerate role, and an important role, but it is not enough to examine the special needs of a core course. This I have tried to do by enumerating the four goals that have guided our efforts over the years. We have made considerable progress toward these goals, yet our electrical engineering requires continuing effort. But let me conclude by reaffirming what I obviously believe: the price of excellence is high, but it is worth the price.

*Editors' Note: Officer Effectiveness Report, the annual evaluation of an officer's performance and potential for growth.

CHAPTER 10

THE ENGLISH DEPARTMENT: WHY AND WHAT*

My bias should be clear from the start: I believe every USAFA graduate should be able to read perceptively, write persuasively, speak convincingly in standard English and to do so with a facility that marks an educated individual. To attain that frequently elusive goal, we need a variety of courses and approaches, a fact self-evident to anyone who has heard the "like ya' know, man" speech of many young people emerging from the nation's secondary schools. Less apparent but equally necessary is the demand for structure, grammar, and logic in writing because many of our students—like those in colleges across the country—have done little writing and have had still less instruction in the rudiments of the English language.

Some statistics will speak for themselves. Reflecting the national trend, our students' scores on the verbal portion of the scholastic aptitude test have declined steadily: Entering scores for the Class of 1969 show a mean of 600 on the verbal aptitude portion of the Scholastic Aptitude Tests. By the time the Class of 1979 entered, the scores had declined to 549, a trend reflecting the general national decline. More significantly the number of students presenting exceptionally high scores in verbal aptitude has continued to decrease. Perhaps even more dramatic, our entering students' scores on the Test of Standard Written English range from 20 (the lowest possible) to 60 (the highest), with an average of

*By Colonel Jack M. Shuttleworth, Permanent Professor and Head.

49, the 66th percentile of college-bound seniors. At a time when the Air Force alone produces an estimated 500 million letters annually at a cost of \$120 million just to read them, the need for officers well trained in merely the practical verbal skills has never been greater. Despite the advent of electronic communications and computerized records, the demand for efficient writing and speaking remains at least as great as it has ever been.

Likewise the needs for our officers to understand the values they may be called upon to defend, to recognize the ethics undergirding their decisions, to participate in the rich cultural heritage they have been endowed with, and to share fully in the vicarious human experiences embodied in the creative literatures remain essential stimuli to our continued emphasis on reading great works of the past and present. This dual role is not new; it has been with us from the first days of the Academy. In the original statement of mission Brigadier General Peter R. Moody, first head of the English department put it this way:

We accept the primary responsibility for teaching cadets to express themselves effectively and correctly; we expect them to read good literature with understanding, appreciation, and enjoyment. We encourage their interpretive and imaginative powers toward the end of expanding and maturing their minds.

Early Years

To meet the challenge of teaching cadets "to write, speak, read, and listen effectively; and to understand and enjoy literature as it contributes to developing the mature character required of an Air Force commander," the first classes underwent a three-year English program totaling 269 contact hours of instruction. The program, distributed as shown in Table 10-1, stressed organization and clarity in writing, and increased maturity of perception in reading.

TABLE 10-1. 1955 English Programs (Class of 1959)

<u>Year</u>	<u>Contact Hours</u>	<u>Papers</u>	<u>Speeches</u>	<u>Literature</u>
Freshman (Eng 101-102)	108	24 including re- search	6 5-min speeches	Intro to essays drama, fiction, poetry
Sophomore (Eng 201-202)	107	8 essays	4 5-10 min speeches	Major trends of Western liter- ature: Homer thru 18th C.
Junior (Eng 301-302)	54	3 essays	2 10-min speeches	19th - 20th C. through Eliot

During those 269 hours, 70% of the classroom effort was devoted to English language and literature, less than 15% to writing instruction. Thus, the breadth and depth of reading and the extent of writing practice indicate the quality of preparation and the assumed verbal facility of students entering college out of the high schools of the fifties. In the sophomore course, for example, the reading list included Aeschylus, Sophocles, Chaucer, Shakespeare, Milton, Voltaire—the best who have thought and written over two and one-half millennia.

Middle Years

By 1967 the academic preparation our students brought with them was beginning to decline. The causes? The advent of widespread television addiction, growing distrust of the establishment during the Vietnam conflict, and decline of educational standards in the schools are all possible culprits. But regardless of cause, the English program had undergone some evolutionary changes to respond to perceived cadet needs and to allow room in the curriculum for an academic major for each cadet (see Table 10-2).

TABLE 10-2. 1967 English Program

<u>Year</u>	<u>Contact Hours</u>	<u>Papers/ Speeches</u>	<u>Writing Instruction</u>	<u>Literature</u>
Freshman (Eng 111-112) 88		9 themes	14 hours	Intro to language, modern novels, Greek classics, Bible, Chaucer
Eng Senior 430 (Tech Writing) 40 to 48		5 papers 1 speech	24 hrs	None
or				
(Eng 450 Adv Comp & Speech)	40 or 48 -----	2 long papers 5 speeches	9 hrs	None
4 semesters	168 to 184 hrs		23 to 38 hrs	

The coherent program of the early years with its continuing reinforcement of writing skills and its significant study of major figures of the western tradition had given way to a fragmented, sometimes eclectic approach to some writing instruction (13%-20% of class time) and a few key figures or concepts (honor, love, duty, truth) in our cultural heritage.

Present

The English curriculum continued to evolve (*descend* may be a better word) from what now seems the almost Edenic original. As students came to the Academy with decreasing

skills in writing and appallingly little acquaintance (intimate knowledge had long since disappeared) with their literary and cultural heritage, we gradually came to see that we were grading students on their writing performance but spending the large bulk of our time on literature. That disparity seemed unfair: We concluded that we ought to grade students on what we teach. Consequently during the last several years we have slowly moved to a heavier concentration on the principles and practice of writing. As a consequence of the 20th Anniversary Study and our recognition of altered student need, our courses are now aligned as shown in Table 10-3.

TABLE 10-3. 1979 English Program

<u>Year</u>	<u>Contact Hours</u>	<u>Papers/ Speeches</u>	<u>Writing Instruction</u>	<u>Literature</u>
Freshman (Eng 111)	42	7 papers	34	a few essays
Sophomore (Eng 212)	42	8 papers 6 speeches	18	essays
Junior (Eng 330)	42	7 papers 2 speeches	24	None
or (Eng 350)		6 papers 1 speech	23	None
Senior (Eng 406) Values in Western Lit)	42	2 papers	3.5	36
4 semesters	168 hours		78.5 - 80.5 (47 - 49%) writing	

But the figures alone do not tell the whole story of the current state of the department and its programs. Hence, a more detailed discussion of the four core courses and other departmental programs follows.

Freshman courses. As in earlier years, the best students (now about 100 each semester) are placed in English 111 honors, distinguished from the regular course by its faster pace and the balance of content (21 hours to writing, 15 to literature). It offers a brief introduction to short stories and poetry; in composition it moves from the one-paragraph essay to the research paper. To qualify for English 111 honors, cadets must score above 580 on the SAT and 52 on the Test of Standard Written English.

But, of course, the majority of our students, about 600 each term, appear in the standard course. All students who have low scores on the Test of Standard Written English, the verbal portion of the SATs, or have a waiver of any academic admission standard take English 111 during the fall semester. We place them there for two reasons: to allow a fall-back to the spring term if they fail, and—more important—to give them the basic enabling skills for those college courses which require them to read, write, or think in words. As now instituted, English 111 is heavy on writing (34 hours) with only a few readings to hint at the literary riches available for the few willing and able to move to them.

Sophomore course. English 212 picks up rhetorically where 111 ended. Sophomore students spend about 45% of their time on writing and analysis of communication and about 55% on developing their speaking skills. Perhaps 212 should properly be called "rhetorical analysis," for it is more analytical and critical in its approach than the apprentice writing work in English 111. It results in improved ability to write and speak persuasively.

Junior courses. Cadets majoring in science or engineering take English 330, *Technical Writing*; those in humanities or social science, English 350, *Advanced Composition and*

Speech. These pre-professional courses allow students to write and speak on topics related to or derived from their academic majors. Parallel in intent, the two courses also share a practicality, derived from using actual Air Force problems and writings to illustrate the principles the courses teach. A unique feature of these courses is the guidance of a liaison officer (L.O.) from the cadet's major discipline; the L.O. helps direct the cadet's research, evaluates the technical accuracy of the report, and shares in the grading of the major report and the accompanying formal briefing. These courses conclude the formal instruction in writing and prepare the student for the senior-year course and for writing in the Air Force.

Senior course. English 406, *Values in Western Literature*, helps students become acquainted with some of the great minds and works of our culture by examining significant values appearing in the works. The course uses Joseph Wood Krutch's *The Modern Temper* as a kind of challenging intellectual backboard against which students can bounce their ideas and presuppositions. Attempting to stir cadet examination of their own values, the course inevitably outrages some students, challenges others, and stimulates many to think seriously about Faulkner's eternal verities: "love and honor and pity and pride and compassion and sacrifice." Writing in the form of two papers, a graded review, and a final accounts for 10% of the course's time.

Although the examination of values generally succeeds, for some students whose interest in literature is quickened, the course comes too late. They have no opportunity for further structured study of their literary inheritance. Finally, we accept rather modest aims for the course: to stimulate thought about personal and cultural values, and to provide basic critical skills for a lifetime of intellectual growth.

Electives. Our elective courses have led a life of their own, reflecting curricular emphasis. Enrollment in our literature electives began in earnest in 1957 with eight courses and a

short-lived English major of 32½ hours of English study. The English major ended but the courses thrived through the sixties. In 1967 we had 180 cadets enrolled in 12 courses as diverse as modern drama, satire, and the classics. With the curriculum changes resulting from the 20th Anniversary Study and the end to the cooperative graduate program, both the opportunities and incentive for continued enrollment in literature courses diminished. In academic year 1975-6 we enrolled 238 students in our electives; a year later enrollment had dropped 58% to 99. Since that precipitous decline, elective enrollments have inched upward to 137 in eight English courses. But for four semesters straight we have been unable to offer British literature, owing to lack of enrollments. Other electives have faced similar fates; in 1976 modern drama, for example, was replaced with a course in creative writing. The classics course constantly faces the threat of extinction; even the Shakespeare course has on occasion languished with but four or five students. Only a continuing program to tell cadets about the personally enriching and professionally useful courses in the humanities major we administer has saved several courses from extinction.

Though the vagaries of the various iterations of the elective curriculum would make illustrative reading, the important point here seems to be that we continue to offer courses ranging from the classics to creative writing, with American Literature not surprisingly the most consistently popular. Of course, the departmental special topics course, English 495, has drawn its share of interested, often scientifically trained students. The course has ranged over such topics as satire, honor in literature, Black literature, science fiction, film, hero and anti-hero in literature. Of those, science fiction and film courses regularly attract the largest enrollments.

Extra-Departmental programs.

In the past ten years or so, department members have grown increasingly involved in programs that go beyond the

bounds of the normal classroom activity. Some result from participation in cadet programs; others, from Academy or Air Force needs.

Forensics. The Cadet Forensics Association began with the Academy and has thrived as the Academy has grown. In 1958-1959 C1C Harold W. Todd was the Cadet-in-Charge when the 15-man squad won 107 intercollegiate debates. That year, too, the Academy sponsored its first National Invitational Debate Tournament (NIDT); thirty leading forensics schools in the nation debated "Resolved that Congress should be given the power to reverse decisions of the Supreme Court." In that first tournament Brigham Young University defeated Washburn University on a 3-2 decision. Since then the NIDT has missed only two years: 1963 in memory of President Kennedy and 1973, when the Academy hosted the National Debate Tournament.

As the Academy has grown and changed, so has our forensics program. The NIDT now draws 60 to 70 teams and our own squad has doubled to 30 cadets; they now average 500 rounds of debate compared to 107 in 1959. As a consequence our teams have attended the National Debate Tournament five times and have been ranked in the top ten forensics programs nationwide for the past eight years. We have also expanded our emphasis on competition in individual speech events to complete our two-man team debate. Our cadet competitors today are certain to make their keenly honed communication skills especially useful to the Air Force of the future just as C1C Harold Todd has in the years since he graduated.

"Icarus" and the Creative Writing Symposium. To do for the written word what the forensics program did for the spoken, *Icarus* began its existence in 1965 as a way to recognize cadets who "demonstrated maturity of ideas, technical skills, and imagination in [their academic] essays." Like *Chandelles* and *Wingover* of the department's early

years, *Icarus* published solely cadet writing but with faculty editorial advice. By 1968 *Icarus* had become the publication of the newly founded Creative Writing Symposium, an annual competition to select the "best of the cadets' creative writing efforts." The Symposium, now firmly established, continues to encourage cadets to express themselves creatively; their writings are judged by members of the department who select first, second, and third places in the various categories. Those places and other deserving entries appear in the annual edition each May. In 1974 the generosity of Mrs. Paul T. Cullen allowed us to add the Brigadier General Paul T. Cullen Award. Presented annually in memory of her late husband, the award recognizes outstanding cadet creative writing.

We expect *Icarus* to continue to thrive, for it offers cadets an outlet for their often considerable creative talents. But perhaps more important, the Symposium and *Icarus* together reaffirm the value we place on language and literature, on the imaginative use of ideas and words—qualities every Air Force officer needs in abundance.

Blue Tube. Another way cadets can express themselves imaginatively occurs in English 330 Honors, "The Blue Tube," established as a special course in written and spoken communication carried out in a unique environment. Each semester eighty top students are invited to join one of four sections. They learn scriptwriting, news gathering, and the technical operation of each TV production position. Yes, TV production, for English 330H's unique learning environment is the television studio. This "classroom of the air" produces a twice-weekly feature program which brings cadets and faculty the "what's happening" at the Academy over classroom TV sets between classes. And, surprisingly, technical writing lies at the core of the learning experience. By semester's end each student writes a technical description of equipment in the studio as well as a full-blown, formal technical report. The course provides hands-on experience made even more realistic because a concerned audience

reacts to their communication efforts. A team of NCO instructors also adds another dimension of live Air Force experience in this total communication course. Blue Tube's success goes beyond the Academy; it is already known as one of the best student-produced programs in the nation.

Technical Editing and Summer Training Programs. Our technical editing service and summer training programs tie the English department more closely to the other academic departments. In the summer, senior members of the department teach newly assigned faculty in most departments about cadet writing standards, key terms for grading, and ways to demand sound writing. We also offer an editorial service for all faculty publications and especially for those monographs published under the faculty technical report imprint. Though both activities require time and attention, they also serve to increase faculty awareness of effective writing standards and of the need for clarity and organization in writing. By raising faculty awareness, of course, we hope to make our work with cadets more effective by increasing the number of faculty who actively oppose sloppy thinking and even sloppier writing.

Executive Writing Course. Beyond the Academy we serve the Air Force at large with the Executive Writing Course. We began it in 1974 when the Air Force Surgeon General asked for help in improving his staff's writing, and the demand has grown. Though the original eight-hour course has been cut to four hours, its basic nature has not changed. Working with a core of standard letters and messages, plus writing sent to us from each requesting unit, two instructors take their audiences through ways to improve letters, regulations, and reports.

The greatest change has occurred in the number of people the course now reaches. Some 1,000 middle and senior managers saw the course during each of its first years. In 1978, though, 10,000 saw it. The course is booked a year ahead, even though we now accept requests only from major

headquarters. The success of the course and its continued demand bring a substantial cost in manhours and effort; every trip requires several hours of extra preparation and administration. Nevertheless, the benefits to both the Air Force and the Academy seem worth the effort. Each year numbers of Air Force writers and managers learn better ways to write clearly and economically: Air Force writing is the one place we can legitimately do more with less. And the Academy, too, benefits. Our team members bring back with them samples of current Air Force problems and programs for use in our pre-professional courses. An unanticipated fringe benefit comes with the added credibility both our courses and instructors have by their travels; simply being in demand throughout the Department of Defense makes our instructors all the more credible in the classroom.

Effective Writing Films. An outgrowth of our success in the writing and speaking programs was a request from the Air Force Director of Administration that we revise the Air Force's Effective Writing Course. The earlier one, in use since the late '50's, had been suspended because its slighting depictions of minority and female members detracted from its teaching usefulness. It had grown outdated both in what it taught and how. A team of department members spent nearly two years planning, writing, testing, and guiding the three new films being put into circulation this year. These films—effective forms of communication themselves—will teach thousands of people in the Air Force how to organize and express their ideas in writing. Cumulatively we expect the films' results to be significant in improving the form and economy of Air Force writing.

Now Where?

Despite the siren lure of our success in extradepartmental activities and in our service to the Air Force at large, our efforts will continue to be directed primarily toward helping cadets learn to write effectively, think clearly, and perceive

humanely their responsibilities as sharers in a rich culture. Naturally we intend to continue doing those things we do well, but we know where we can improve. To this end we expect to strengthen the training we provide new instructors, preparing them more fully for the demands of the classroom. We are also increasing the number of class visits by supervisors, so that we can strengthen each instructor's performance with positive, collegial critiques. Student evaluations, too, help us identify successful techniques and pinpoint the occasional course weakness. In both areas our aim is to improve student performance, bringing it closer to each cadet's capability. Yet another change in process is one we hope will strengthen teaching in the freshman program; we are now urging everyone to teach at least one section of freshmen regularly. If wisdom comes with age and experience, the freshmen deserve their share of what we have gained. Furthermore, new instructors no longer routinely teach four sections of basic freshman English 111 each semester for the first year of their assignment; the grading workload and the frequent individual conferences make a four-section freshman load intellectually and physically debilitating. With these changes we hope in the future to improve still more on the intellectual quality and the practical challenge of our teaching.

And while we have been emphasizing our teaching, we are also strengthening our standards of student performance. No longer, for example, can a cadet pass a course without writing at least one passing (C grade) paper; in earlier years, a student could raise his grade average by good quiz performance but still lack the writing skills essential for continued academic success. Now, he or she must write to at least the minimum acceptable standards before earning a C. The student who cannot write to that standard must learn those skills before we pass him on to the next, more demanding courses. (Naturally, the difficulty comes in defining "minimum acceptable standards." About the nearest we can come

to agreement is this: a student must be able to write a logically organized essay of at least five paragraphs with a clear thesis, unity, coherence, and a conclusion; it should be free of the major errors in language—misspelling, lack of agreement, fragments, comma splices, run-on sentences, case errors—that identify an inadequate writer.) Our goal still is to be certain that every cadet is at least capable of competent writing before we certify him or her as a graduate of the Air Force Academy. Though we have not always met that goal in the past, we are determined to do so in future years.

We have other hopes, even plans, for the next several years. As a part of the curriculum, we would like to offer a practical journalism course to help the Air Force meet its needs for officers who can deal responsibly with print media. Such a course would also serve those cadets, journalistically inclined, who prepare cadet publications. Similarly, recognizing that our students will serve well into the twenty-first century, we must gradually expand their understanding of television, both its capabilities for benefit and its potential for malicious manipulation of an unsuspecting viewer's attitudes and beliefs.

However, we also know that one of the best ways to prevent that kind of unwitting manipulation is to make our students aware of the nature of language, the subtleties of human expression, and the creative powers of human imagination. We believe we can best gain that awareness by keeping at the core of our discipline those strengths represented by close literary study and expression: clarity of thought, the humane values, an understanding of the human condition, a perception of the rich variety of human achievement.

Besides our curricular demands, we have obligations to our faculty, as well; the young officers who come here to teach must be encouraged to grow professionally and intellectually, bridging that kind of schizophrenic tension that marks the military academician, the scholar-soldier. To stimulate faculty development we hope to see several changes:

- an Academy scholarly journal would provide our faculty opportunities to bring before their colleagues scholarly or professional discoveries or concerns;

- active promotion and use of research and sabbatical programs to enrich our teaching and contribute to personal growth;

- progressive responsibility in assignments so that each officer is qualified to and has the chance to serve as a supervisor;

- assignment of additional duties so each officer gains new managerial knowledge about the way the Air Force operates;

- a devolution of responsibility (and authority) to the lowest possible rank, for we know our young faculty respond when challenged;

- increased travel budget so that each member can expect to attend at least one professional meeting during a four-year assignment. (When the first class graduated, we were receiving slightly less than two hundred 1959 dollars per instructor for travel each year. If we were to return to the 1959 level with even a modest allowance for inflation, we would be able to send each of our 45 faculty to one professional meeting a year.)

- professional (and professorial) advice for junior faculty to help each member publish during his or her assignment.

In future years as our students once again come to us able to read and write skillfully (as national trends indicate

they might), we hope to return to more emphasis on examining the great literary artifacts of our culture and to do so with a faculty that is professionally and intellectually prepared. With that literary study balanced by our continuing attention to writing, we believe we can continue to meet our nation's expectations that Air Force Academy graduates represent and willingly defend that which is best in our society.

CHAPTER 11

DIVERSE ASSIGNMENTS, DIVERSE CULTURES: THE DEVELOPMENT OF A FOREIGN LANGUAGES CURRICULUM*

In every way we are a planet, we are not isolated countries. Our beliefs, our policies, our actions reverberate beyond national boundaries. We have recognized that our needs compel us to establish economic, industrial, and diplomatic ties, yet much of our population is ignorant of the tie that ultimately binds—the language connection.

—June K. Phillips

Since its inception, the Department of Foreign Languages has undergone many and varied transformations. However, its continued presence as a core requirement within the curriculum has reaffirmed its value as part of the cadets' overall education. Now, after our first twenty-five years, it is fitting to re-examine and redefine some of our basic goals and future aspirations. Toward this end, we shall present a historical, current, and philosophical view of the Department of Foreign Languages with the hope of disclosing the essence of foreign language teaching at the Air Force Academy.

I

History

Exposure to a range of perspectives on human behavior is essential to education.

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When the U. S. Air Force Academy was established in 1954, one primary objective was to provide each cadet with a "basic baccalaureate-level education in airmanship, related sciences, the humanities, and other broadening disciplines." As part of the humanities requirement, it was envisioned initially that each cadet would receive twelve semester hours of foreign-language instruction. To shield cadets with low language aptitude, however, Lieutenant General Harmon directed that foreign language study be included only as an elective to be pursued during the cadet's senior year. Because of General Harmon's decision, foreign language study was still three years away when the Academy accepted its first class of cadets on July 11, 1955. In the interim, Colonel Peter R. Moody, Professor and Head of the Department of English, was designated to act also as provisional head of the Department of Foreign Languages. For the next three years, only one experimental foreign language course was offered, a two-semester basic introduction to French that was completed by only seven cadets on an elective basis. On March 3, 1958, however, the status of the foreign language program changed drastically. Instead of being an elective course, as initially desired by General Harmon, a curriculum change made the study of ten semester hours of foreign language a prescribed part of the cadet's core requirement. As a result, the next several months, between April and August, saw extensive and often hectic foreign language faculty preparations being made.

On April 17, 1958, Lieutenant Colonel Alphonse R. Miele arrived and assumed responsibilities from Colonel Moody as Acting Head of the Foreign Language Section. Two months later, on June 4, 1958, the Department of Foreign Languages became an independent department within the Division of Humanities. During the five months prior to the start of the fall semester, fourteen new instructors arrived, and all course materials for the start of the academic year were prepared. Although it had been intended to offer only French

and Spanish at the Academy, in 1957 retired General Spaatz, a member of the Board of Visitors, requested Russian be added because of its strategic importance to the United States. Just months before classes were to begin, German also was added to the curriculum at the request of General McCormack, another influential member of the Board of Visitors. As a result, academic year 1958-1959 saw an initial Academy foreign language program offering French, German, Russian, and Spanish.

Colonel George L. Holcomb arrived in late 1958 to become the first Permanent Professor and Head of Foreign Languages. At that time, the Department was ready to assume its intended mission of contributing "to the general education of cadets so that they may be better equipped to become effective career officers in the United States Air Force." More specifically, the objectives were to cultivate in cadets a reasonable proficiency in understanding, speaking, reading, and writing a foreign language, and to give cadets an introduction to the culture and customs of a foreign country. With the conviction that every effort had been made to provide a language program that would both challenge the abilities of the cadets and also be meaningful to their future careers, the 1958 fall semester foreign language program finally was launched.

During these early years, the teaching strategy employed in the classroom emphasized a three-phased approach involving total immersion in the target language. Initially, cadets were introduced to the new sounds of the language. The second phase included a period of vocabulary building and learning the grammatical structure of the target language. Finally, in the last phase, students were expected to apply their knowledge by "pulling everything together" into a functional whole. To provide the opportunity for maximum learning and rapid progression, all classes were reorganized every six weeks and rearranged homogeneously according to cadet performance. In the classroom, instruction was carried out

primarily in the target language, supplemented with cultural readings, regularly scheduled language laboratories sessions, and the liberal use of audiovisual materials such as TV capsules and films.

As early as September 22, 1958, Colonel Holcomb recommended to the Superintendent that foreign exchange officers from France, Germany, and Spanish-speaking countries be added to the Department to provide enrichment and first-hand knowledge of various foreign language cultures and traditions. The Superintendent agreed, and in May of 1960 Captain Horst M. Judel from the German Air Force arrived as the Department's first exchange officer.

After the first year of language study, it became evident that there were serious difficulties associated with teaching language to first-class cadets. Such an arrangement prevented follow-on courses from being offered for those cadets who wanted additional language training, either for future international assignments or to meet requirements for graduate study. In May 1959, the problem was resolved. The Academy Board decided that beginning with academic year 1959-60, foreign languages would be taught in the cadet's third-class year. In addition, the Board allowed the students their choice of selecting the language they wished to study.

At the end of the 1960 spring semester, Colonel Holcomb retired and Colonel Alphonse Miele became Permanent Professor and Head of the Department. Under Colonel Miele, the audiolingual teaching method continued to receive emphasis, with a concentrated effort being made to fully develop the Foreign Language listening and speaking skills of our future officers.

During the summer of 1961, a rigorous instructor training program was introduced to reacquaint instructors with the difficulties of learning a foreign language. To gain a valuable insight into what it was like for a foreign language student at the Academy, all new instructors were exposed to the introductory phase of the basic Russian course. In

addition, at the beginning of the 1961 fall semester, the required number of semester hours of foreign language study was reduced from ten to nine hours, primarily because the fall semester was substantially shorter than the spring semester. Also during this time Chinese was added as the fifth language offering at the Academy, and a faculty foreign officer was authorized from the Nationalist Chinese Air Force in Taiwan.

After several years of teaching experience, it became apparent that students who came to the Academy with prior language training were not sufficiently challenged in the basic courses. To resolve this problem, it was decided to initiate a placement/validation examination for all students with prior language knowledge. As a result, students who demonstrated a first-year or better level of competency received nine hours of validation credit; those not validating were placed into their second language choice. This procedure, admittedly, did not offer much flexibility. In the fall of 1963, additional placement/validation changes were made to allow students with substantial language backgrounds either to pursue that language at the intermediate level or to begin a new language study at the basic level.

Between 1964 and the summer of 1968, several innovative programs were established to improve language teaching and to keep pace with the many advances that were occurring in the discipline. Moreover, each language section produced its own textbook designed to meet the specialized professional needs of future Air Force officers. The first of these, a French textbook, was completed in the spring of 1965 with the textbooks in the other languages appearing shortly thereafter. During the next three years, every effort was made to supplement the new texts with laboratory and television programs.

At the end of 1968 spring term, Colonel Miele left the Department to become Assistant Dean of the Faculty. Thereafter, Lieutenant Colonel Francis W. McInerney, Jr.,

was chosen Acting Head of the Department. During the ensuing period of relative stability, a new 98-position language laboratory was completed to provide additional versatility in the foreign language program.

In the fall of 1970, a significant change was made in the curriculum that affected foreign language study at the Academy. As a result of the Academy Board's ruling that cadets needed "greater freedom in pursuing their majors," the foreign language core requirement was reduced from 9 to 5½ semester hours. In addition, the Board decided to shift the foreign language core training to the cadet's fourth-class year in order to increase scheduling flexibility in the majors' program. In contemplating our future, the Department recommended two proposals: first, that we be allowed to offer a major in foreign language study; and second, that the reduction of 3½ semester hours be taken from study time and not class contact time. The Board rejected the first proposal, but did allow foreign language training to continue on a one-hour, five-day-a-week basis with a corresponding reduction in student preparation time. In addition, amidst this curriculum turmoil, a sixth language, Japanese, was introduced during the fall semester, 1970.

In the spring of 1971, Colonel William Geffen became Permanent Professor and Head of the Department. Because the previous years had shown that substantial adjustments were needed in order to offer cadets a more meaningful program based on the Department's mission and objectives, the Department decided to add a one-semester, 151-level accelerated course to the core. This permitted those students who had a strong linguistic background, but were not proficient enough to validate, to complete the foreign language requirement in just one semester.

During the next five years, the Department concentrated on developing depth in course content rather than breadth, as formerly had been the case. In addition to refining the placement/validation exam, the basic program now had to be

supplemented with the necessary materials to realize the goal of in-depth language study. As an initial step, it was decided to apply to language instruction the methods of computer-assisted and programmed-learning instruction, whenever possible. Furthermore, videotaped cultural and grammatical review programs were locally produced and integrated into each course. A "Culture and Civilization Handbook" also was written by each language section to improve the cultural content of their courses. These course revisions finally culminated in the installation of electronic classrooms to improve the aural comprehension and speech production skills of all the basic students.

The fall of 1976 was marked by two events: At the request of Mr. W. P. Clements, Deputy Secretary of Defense, Arabic was introduced as the seventh language offered at the Academy; and the foreign language core course credit was once again reduced from 5½ to 4½ semester hours. Such action resulted in foreign language being offered on a one-half semester basis for three half-semester. This new curriculum format, however, presented some unique scheduling difficulties. During the 1979 fall semester, therefore, the course numbering and time sequences again were altered. Thereafter, languages were offered over the entire academic year for three semester hours of credit in one semester and one-and-a-half semester hours of credit in the other.

At the start of the summer of 1978, Colonel Geffen, who had been Department Head since 1971, departed on a two-year academic sabbatical leave to the Defense Language Institute, Monterey, California. Replacing him as Acting Head was Lieutenant Colonel Ruben A. Cubero, a 1961 Graduate of the Academy who previously had been assigned to the Department of Foreign Languages from 1972 to 1975.

In the last twenty-five years the Department of Foreign Languages has continued to grow. From its embryonic stage in the Department of English, it is presently one of the largest departments on the Faculty. Never static and never

satisfied, the Department's continued quest has been to refine its program in order to make it a viable and useful input into the cadet's total education. Let us, therefore, turn now to where foreign language teaching is today at the United States Air Force Academy.

II

The Current Program

Curriculum is the keystone that holds the educational structure together. The core of this keystone is comprised of all those forces, events, and outcomes that embody the educational scene. To be effective this link must be strong and solid, but not rigid. It must be able to weather and adapt as necessary to support the institution it serves.

—June K. Phillips

In discussing the current program, it would be well to examine where the Department stands today with respect to the overall Academy curriculum and the foreign language discipline at large. The Department has neither a disciplinary major nor any primary responsibility for managing a divisional major. As has been the case since the very first days of its existence, the Department of Foreign Languages is a servicing organization that provides foreign language instruction as part of the core curriculum and supports other disciplinary and divisional majors.

With regard to the latter, there are three disciplinary majors—Geography, History, and International Affairs—and one divisional major—Humanities—all of which either recommend or require foreign language courses beyond the one-year core sequence as a major's requirement. Of these, the foreign language specialist track of the Humanities Divisional Major allows the cadet the most comprehensive foreign language training at the Academy. The cadet may take a minimum of five courses beyond the core. These may all be in one language or the student may opt for studying two or more foreign languages.

The U.S.-French Air Force Academy Cadet Exchange Program, instituted in 1969, is certainly the most important nonmajors' program for which cadets are required to study a foreign language. Every year for the past decade the French Air Force has sent approximately five senior cadets to Colorado Springs, and the Academy, in turn, has sent an average of five first-class cadets to the Ecole de l'Air in Salon de Provence, France. While in France, cadets are totally immersed in the French language and culture. For the entire fall semester, they take such diverse courses as telecommunications, aeronautics, thermo propulsion, and military studies; they also participate in organized sports and flying programs.

To prepare for this unique and linguistically demanding experience, cadets are required to take a minimum of six semesters of French language courses, the capstone of which is the specially designed French 491 and 492 series. French 491 is a current culture and civilization course taught by the French Exchange Officer, and French 492, dealing with scientific theory, is an intensive six-hours-per-day, five-days-a-week course offered for eight weeks during the summer. While enrolled in the 491-492 series students are taught French culture, literature, grammar, the military system, aeronautics, electrical engineering, mathematics, and most importantly colloquial, everyday speech.

Although the total number of cadets who participate in this program is small, the benefits that accrue to the governments and air forces of both countries are truly immeasurable. The fostering of cultural understanding and the removal of ethnocentric barriers, which the exchange program seeks, are among the primary goals of the entire foreign language curriculum at the Academy.

Regarding the foreign language core curriculum, we have already noted that during the past twenty-five years the core requirement has been reduced from its original ten semester hours to the present 4½. This reduction has been

symptomatic of the continued lack of support for foreign languages throughout higher education in general. Closely related to this has been the growing apathy among college students for foreign language study, especially during the 1960s and into the 1970s. Understandably, such developments have been viewed with great concern here as well as at other foreign language departments throughout the nation. Nevertheless, as we celebrate the Air Force Academy's 25th Anniversary, there are some heartening developments in foreign language education. Most notable is the recent establishment of the President's Commission on Foreign Language and International Studies, which has the stated objective of recommending "means for directing public attention to the importance of foreign language and international studies for the improvement of communications and understanding with other nations in an increasingly interdependent world."

Nonetheless, despite positive thinking about the future as a result of the Commission's proposals, the problems of the present remain. How are we conducting a meaningful course of foreign language study in less than half the time that was available a quarter of a century ago? First, we have had to examine realistically what we expect the student to acquire from a one-year course. In any two-semester course, be it 10 or 4½ semester hours, the student cannot be expected to "speak like a native." What the student can achieve, however, is a modicum of communicative competence within the confines of the vocabulary and structure to which he has been exposed. Of equal importance is the cultural awareness that the study of a foreign language fosters. It is for this particular reason that we have always paid so much attention in the classroom to the cultural aspects of the country or countries in which a particular language is spoken. In this regard, we have been especially fortunate in having a number of foreign officers teaching in the Department, all of whom have enabled the students to appreciate a slightly different perspective on the world and their environment.

Recently, one of our significant changes in methodology has been to integrate advanced electronic equipment into the curriculum. Previously, instructors were limited to using a centrally located language laboratory containing row upon row of student positions. Presently, in each classroom we have electronic classrooms featuring individual cassette recorders tied in to a central instructor console. No longer are students scheduled for a lab period only once each week. Instead, taped programs have become part of each recitation thus providing greatly increased and individualized student participation. Students now may work through various drills and exercises at their own pace utilizing individual cassette recorders. Of course, such activities permit instructors to concentrate on slower learners without interfering with the progress of others in the class. In addition, the advent of the cassette and inexpensive transistorized circuitry has also expanded the learning process beyond the confines of the classroom into the dormitory by allowing students to accomplish a variety of prerecorded activities and exercises in their own rooms. At present, such materials are available only to those who have their own cassette players. In the future, however, the objective is to provide all cadets enrolled in foreign language courses with inexpensive cassette players. The true benefit of such recorded material is that it simulates a one-to-one relationship between student and teacher thus enabling both to make more efficient use of the time available.

Closely related to efforts to intensify the learning process through increased use of electronic equipment has been a concerted drive to determine exactly what the student is expected to derive from the learning experience. Evolving from such efforts has been the development of detailed study guides and learning packets that tell the students precisely what is expected of them throughout the entire course. To a large extent the techniques of criterion referenced instruction have been employed across the entire spectrum of language training.

In an attempt to maximize the foreign language learning experience, a three-track system (basic, accelerated, and honors) at the basic core level has been developed in French, German and Spanish. Because of the availability of the three ability tracks in these three languages, approximately 90 per cent of all incoming students who have had one of these three languages in high school continue the study of them here.

In essence, this is where the Department of Foreign Languages is today, namely, attempting to make the limited available time as productive as possible. In doing this, every possible effort is being made to utilize the latest equipment and teaching methods to guarantee a solid, flexible program of foreign language training that will support the objectives of the U.S. Air Force Academy.

III

Foreign Language Philosophy

The real purpose of language is to talk about the world you can't see: the past, the future, the world of the mind. If we fail to master the tool, then difficult, important ideas go out of public discourse.

—Richard Mitchell

Three questions are often asked about the academic curriculum at the USAF Academy: Why do we teach foreign language? What languages do we teach? And, how do we teach those languages to our cadets? To a great extent, the answers to these specific questions determine the Department of Foreign Languages' teaching philosophy. The answer, for example, to why we teach foreign languages can be explained in the light of our foreign language goals and establishes the broad parameters within which we can effectively teach. The answer to what languages we teach examines the fundamental criteria used to select our

foreign language offerings and sets into motion our entire teaching effort. Finally, the response to how we teach languages to our cadets reveals the manner in which we overcome some particular constraints to the transfer of knowledge in the classroom. This latter answer specifically forms the foundation for the three principal tenets of our teaching philosophy.

Certainly one of the most important reasons we teach foreign languages at the Air Force Academy is to provide the Air Force with officers qualified to communicate effectively in a foreign language while stationed in another country. Both the Air Force and the country can derive great benefit from the favorable image projected by a truly multilingual officer corps and by the strong bonds of friendship that are naturally established through foreign language communication.

However, other equally valid reasons exist for an individual to learn a foreign language. For example, consider humanistic reasons: Certainly many people study a foreign language for personal enrichment. They select a particular language because of a strong affinity for the people who speak it, and because of a personal desire to establish meaningful and long-lasting cross cultural relationships. These humanistic reasons also give rise to a most propitious by product, namely that individuals who seriously study a foreign language begin to identify and empathize with the people of the target country. As a result, the study of foreign languages through a subliminal process of cultural awareness begins to eliminate some of the racial and ethnic prejudices that exist in the world today.

In addition to humanistic considerations, recent research has demonstrated that studying a foreign language can result in other significant spin-off effects with great educational benefit. In the area of reading, research strongly suggests that foreign language study increases vocabulary and improves reading comprehension in English. Moreover, evidence

indicates that foreign language study enhances both auditory discrimination and memorization ability. Finally, as has been felt for years, recent investigations are substantiating the belief that English grammar is both better understood and used following the systematic study of a foreign language. No matter what a person's chosen profession, additional refinement in communicative skills, be they foreign or native, only can be viewed as extremely beneficial for both interpersonal relationships and career development.

Generally speaking, therefore, our reasons for teaching foreign language at the Air Force Academy go well beyond the functional need to qualify officers in a particular language for future service to the Air Force. Personal enrichment, social development, and academic benefit are also of great importance to our foreign language program at the Academy.

As is the case with the entire academic curriculum, the languages we teach should in some way help satisfy the future needs of the Air Force with regard to its career officer corps. In order to meet these requirements, we have carefully adopted the following twofold criteria to select the languages offered at the Air Force Academy:

First, because of the Air Force's world-wide operations, the Academy offers those languages recognized by most nations to be of international importance. Our major offerings in Spanish, French, and German fall into this category and account for approximately 87% of our total enrollment. Since the Academy's inception these languages have been taught to our cadets. The following justifies our commitment to each of these three major offerings:

Spanish is the most widely spoken language in the world; in the United States, it is the second most important spoken language. Its relevancy is underlined by the current need for

for hemispheric unity among all the American nations and by the growing U.S. economic dependence on Mexico, Central, and South America. Moreover, because of our military missions in many Spanish-speaking countries, and our strategic air bases in Spain, it is highly probable that a significant number of our cadets will be stationed on Spanish-speaking soil at some point in their military careers.

Next to English, French is considered the most important international language. It has often been called the diplomatic language of nations. Like Spanish, it is also widely spoken throughout the world, particularly in areas of Canada, Europe, Africa, Indochina, South America, the Middle East, and the United States.

German is the language of our most powerful NATO ally and keystone of our European defense, West Germany. It is the official language of two extremely influential neutral nations of Europe, Austria and eastern Switzerland. German also provides access to significant literature on current philosophical and scientific thought and is spoken throughout Europe and southern South America. With extensive U.S. military involvement in Germany, it is also highly probable that cadets will be stationed on German soil sometime in their Air Force future.

Second, languages are also taught at the Air Force Academy because they have a certain strategic or special international importance for the United States. Unfortunately, the relevancy of teaching these strategic languages is often difficult to ascertain because of the shifting and volatile climate of world politics and the uncertainty of predicting future areas of U. S. strategic or special interest. However, after evaluating the current international situation, our language offerings in Russian, Arabic, Chinese, and Japanese accurately reflect the United States' strong concern for those areas of the world today. These four strategic languages account for approximately 13% of our total enrollment.

In offering Spanish, French, and German, we are attempting to provide the cadets with a foundation in a language that has a high probability of being used sometime during the cadet's military career. With our strategic offerings, the objective is to begin the preparation of individuals who one day may be identified as U. S. area specialists in strategically important countries around the world.

As in every discipline, there are certain unique constraints that must be overcome in the teaching of foreign languages in order to achieve any degree of success. The three most important constraints are time, rapport, and motivation.

In general, there is little doubt that acquiring even a rudimentary conversational level of language proficiency requires years of training and practice. Because 95% of the cadets will take only a modified, one-year language course while at the Academy, speaking fluency is not a realistic goal for the basic-level students. Consequently, the Department of Foreign Languages has found that building upon the existing linguistic background of our cadets is our most logical, expedient, and cost-effective approach to teaching foreign languages. Therefore, the first tenet of our teaching philosophy is to raise the linguistic ability achieved from a previously studied language to a higher level of proficiency. This pedagogical policy has proven sound, because approximately 90% of all incoming students have had prior experience in one of our seven languages.

Second, because language acquisition primarily involves human dialogue, foreign language instructors must be dynamic and skillful in extracting responses from the students. They must also be adept at instilling a desire in each cadet to continue foreign language study. To accomplish this, we actively seek out superior bi- and tri-lingual instructors with exceptionally interesting and varied backgrounds as well as impressive military and academic records.

Therefore, the second tenet of our teaching philosophy is that our instructors must make the teaching of language interesting, enjoyable, and most importantly, relevant to Air Force life.

Finally, although many students have high expectations of attaining a native fluency during their initial exposure to a foreign language in high school, by the time they arrive at the Academy, they are well aware of the complexity and inherent difficulty of language acquisition. As a result, their enthusiasm usually is sustained only by their personal commitment to the language being studied. This commitment is particularly critical at the Academy where foreign language training is part of the mandatory core requirement. To help foster this self-induced motivation for language study, we allow the cadets to enroll in the foreign language course of their choice. This provides the motivational impetus that carries the cadet through the entire academic year. However, due to abnormal operational requirements, such as over-enrollment in particular languages, this policy cannot be implemented at times. We do, however, maintain a certain degree of administrative flexibility by having all the cadets list three language choices in order of preference. In the majority of cases, the cadets are placed in the language of their first choice. In a typical semester, for example, approximately 95% of the cadets are granted their first language preference, approximately 5% are placed in the language of their second choice, and only in the most exceptional cases are any cadets placed in their third choice. Our third tenet, therefore, is to allow, whenever possible, all cadets to select the language of their choice while studying foreign language at the Air Force Academy.

Although answers to the three basic questions of why, what, and how, formulate our basic teaching philosophy in the Department of Foreign Languages, the study of foreign languages must be looked at in the context of the entire academic curriculum at the Air Force Academy in order to

place it in its proper perspective. The Department uses its proportionate share of the cadet's total available time to foster its objectives. Because no disciplinary major is offered, we complement other departments such as History, Political Science, and Geography that do offer area concentration majors. In addition, we are an integral part of the English Department's Humanities Divisional Major for those cadets who decide to pursue a comprehensive foreign language option. In conclusion, our ultimate goal is to contribute significantly to the cadets' overall education by providing them with a solid foreign language foundation. We are confident our program will assist them to assume the varied responsibilities they will encounter throughout their Air Force careers.

CHAPTER 12

SERVING TWO PROFESSIONS: HISTORY AT THE AIR FORCE ACADEMY*

When the first officers selected to teach history at the newly-formed Air Force Academy gathered at Lowry AFB in 1954 and 1955, they shared with the rest of the new faculty a sense of optimism bordering on euphoria. Chosen to help develop the initial curriculum and teach the first cadets, they had a unique opportunity. Within the broad guidelines set down by various study groups, most notably the board chaired by President Robert L. Stearns of the University of Colorado and General of the Army Dwight D. Eisenhower, they could conceive and develop a history program unencumbered by the conservatism of an established institution. The newness of the Air Force—with a self-concept of “progress unhampered by tradition” inherited from the pioneer generation of military aviators and from the Air Corps Tactical School—gave them further independence of conception and action.

The preliminary planning of the curriculum had provided for an extensive and demanding core program with unprecedented attention to the social sciences and humanities, including the equivalent of eight semesters in history.¹ It

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¹For the initial curriculum plan, see the USAF Academy *Catalog 1954-55* and “Origins of the United States Air Force Academy Curriculum,” *Curriculum Pertinence Study* (USAF-A, 1 June 1978), Appendix 1, p. 27. The four-year history sequence is found in the *USAF Academy Department of History, 1955-56* (Denver: USAF Academy, 19 August 1955), pp. 4-5. The strong representation of the humanities and social sciences in the planned curriculum owed much to the personal influence of General Harmon; see William E. Simons, *Liberal Education in the Service Academies* (New York: Teachers College, Columbia University, 1965), pp. 125-127.

seemed evident that the Academy would attract young people of great military and scholastic potential. And the new instructors were excited by plans for the Academy campus near Colorado Springs, with unequalled classroom facilities, audio-visual support, and a fine library.

Perhaps most exciting was the notion that a broad education had a definite place in the preparation of officers for the nation's newest armed service. The description for freshman history which was published before the first class had been admitted is instructive in this regard. History 101-102 aimed to "develop in the cadet an understanding of human nature, human institutions, human ideals, and human creations in the name of beauty"²

The anticipated breadth of education had its limitations. The course was never taught because its goals seemed to lack direct relevance to the preparation of Air Force officers. As the first classes were admitted and the curriculum took concrete shape, one of the fundamental tensions of education in the military environment emerged—the choice between education which prepares for life and for leadership in the broadest sense, or a conception of education concentrating on subjects of direct *utility* to a junior officer.³

The tension had an effect on the members of the Department of History. As historians they were sympathetic to the view of education in the broader sense and understood the reluctance of the historical community, by temperament and training, to assert that history has a direct utility. As military professionals, however, the members of the department knew that utility had a high priority in their environment. Officers must frequently deal with concrete problems demanding immediate tangible solutions.⁴

²USAF Academy Catalog 1954-55, pp. 28-29.

³For a discussion of these fundamental tensions, see Simons, *Liberal Education in the Service Academies*, pp. 19-20, 23-26, 75-79.

⁴William E. Simons, "The Study of History and the Military Leader," *Military Affairs*, 26 (1962), 24-25.

Those military professionals who were responsible for the Academy's curriculum did agree that history—especially because it provided a sense of heritage, tradition, and inspiration—should be part of the curriculum. In that regard, the history of the United States and military history possessed direct utility. Given the experience of World War II, when the United States had proven critically short of experts on different areas of the world, courses in area history also seemed relevant.⁵

The great challenge, however, for officers trained in both professions—history and arms—has been to widen the role of history in officer preparation. Beyond giving cadets useful knowledge, history has a greater promise—to enhance the ability to reason, to provide those who study it with certain perspectives on human affairs, and with an ability to use informed inquiry (“asking the right questions”) as the first step in resolving issues.⁶

This chapter, then, deals with the efforts of the department to serve the two professions with specific courses, instruction, and programs, expanding and maturing over a quarter century. The primary, but not exclusive, focus of this

⁵The post-war concern for area studies, and its implication for the Academy, was reviewed by Richard F. Rosser, “The Air Force Academy and the Development of Area Experts,” *Air University Review*, November-December 1968, pp. 27-32.

⁶On a number of occasions, the department has offered cadets an explanation of the role of history in Academy education. See “Introduction to History,” *Cadet Notebook – The History of World Civilization* (Denver: USAF Academy Department of History, 19 May 1955), pp. 1-5; “Why Study History,” *Cadet Notebook – The History of World Civilization* (Denver: USAF Academy Department of History, May 1957), pp. 1-2; “Why History?” *Cadet Syllabus – History of the US* (1968), pp. 1-3; Edward P. Brynn, “What is History?” in *Cadet Notebook – World History* (USAF Academy, CO: Department of History, Fall 1972), pp. 93-98; and Donald M. Bishop, “The Nature, Utility, and Method of History,” in *Europe and the World Since 1500: A Coursebook* (USAF Academy, CO: Department of History, 1979-1980), pp. 127-141.

work has been on the classroom, although all programs were initiated with the expectation that the scope and effectiveness of the department's work in the classroom would ultimately be enhanced.

Fortunately, the effort has not been all uphill. The department has had the full support of many of the leaders of the Academy and of the Air Force in its efforts to assure history a broad role in preparing officers. Also, the professions of arms and history share highly developed internal norms that demand excellence. Both emphasize the formative and creative role of the professional, as "role model" or as mentor, as innovator or as historian. These common attributes help to explain the close relationship between many of the historians of the United States and the members of the department, especially those members who have been students of these historians. This relationship has benefitted the department immensely, but this is not to suggest a commonality of political or social views among both groups; indeed, the differences can be quite pronounced. What is certain, however, is a mutual respect for the objectives of each profession, a respect engendered by the shared attributes. These attributes make it easier for the department to be both an Air Force unit and an academic organization, serving the two professions.

Serving the Military Profession: A Curriculum for Officers

The military dimension of the work of the Department of History, and its major accomplishments, stem from the Air Force Academy's national purpose, expressed in public law and the mission statement of the institution. The Academy is a *professional* institution charged with the preparation of young Americans to be regular officers of the Air Force. The role of the department and its courses in this process is dual, encompassing both the cadets' *education* and their *military formation*.

History makes these contributions to *all* cadets through a sequence of courses in the core curriculum. Advanced courses and the history major allow a smaller number of cadets to begin specialized study of the discipline and complete their collegiate experience with the satisfaction—and the mental skills—derived from intensive study of one subject.

The Core Curriculum

The prescribed program in history for all cadets has included work in three general areas—area history (which by the late 1960s evolved into World and Area history), the history of the United States, and military history.

It was perhaps inevitable that the core curriculum could not include eight semesters in history due to the Academy's early commitment to a general education which would include all the traditional scientific, engineering, social, and humanistic disciplines *and* several "new" areas of study (e.g., behavioral science, astronautics). By 1959 the core contained only four history courses and, in time, essentially the same curriculum pressures would reduce the number even further. Table 12-1 may be helpful in considering the history core curriculum as it evolved.

World and Area History. The department was determined from the first to possess academic competence in area history and offer courses on the history of important regions of the world. The initial history course taught to the Class of 1959 in its freshman year was "World Civilizations," which combined a lengthy survey of the Western heritage with a substantial lesson sequence on oriental civilizations.

In the Academy's first years, the initial course changed its focus as the department sought the best formula to introduce the cadet to the study of other nations. In 1958, the department offered "Western Civilization" followed by "Recent World History." In 1960 a semester of "Modern European

TABLE 12-1. Core Curriculum

*Representative Core Courses in History**The 1955-56 Plan**

World Civilizations (4°)
 U.S. History (3°)
 Twentieth Century
 World History (2°)
 Military History (1°)

1960-61

Modern European History (4°)
 History of the U.S. (4°)
 Military History (3°)
 Area History Course (3°)

1965-66

Modern European History (4°)
 History of the U.S. (4°)
 Military History (3°)
 Air Power (3°)

1968-69

History of the U.S. (4°)
 Europe and the World
 Since 1500 (4°)
 Military History (3°)
 Air Power (3°)

1974-75 to Present

Europe and the World Since 1500 (4°)
 Modern Warfare and Society (3°)
 The U.S. in a Changing World:
 Critical Issues** (2°)

*Full-year courses

**The semester course, History 300, became a half-semester offering, History 303, in 1977.

History" replaced the earlier courses. This last course endured until 1968.⁷

In retrospect, it is evident that these basic courses emphasized study of Europe and the Atlantic Community. The European focus is easily explained by the prominence of our NATO commitment in American strategic thinking and by the fact that members of the department had been educated when "Western Civilization" surveys had been the standard offering at colleges and universities. Western Civilization not only introduced the cadet to Europe; with the history of the United States, it provided the cadet with a basic understanding of his own Western heritage and values, which he stood committed to defend against hostile systems.

The core curriculum gave additional attention to area preparation by also requiring all cadets to take one of a number of advanced area history courses. As his fourth core course in history the cadet could elect a course relating to a single area—Russia, the Middle East, East Asia, Latin America, or European diplomatic history.

In the mid-1960s, however, shortcomings appeared in this approach. First, the administration of the core options in the different areas became increasingly difficult. It was difficult to staff the department with the necessary numbers of area specialists and difficult to estimate cadet preferences. Second, no valid conceptual link existed between the European core offering and the courses about other areas of the world. Third, the ongoing conflict in Vietnam made the department acutely aware of the need to educate cadets more broadly in other areas of the world.

⁷The department used a number of college texts in teaching these courses, including T. Walter Wallbank and Alastair M. Taylor, *Civilization Past and Present*; E. M. Burns, *Western Civilization*; Crane Brinton, John B. Christopher, and Robert L. Wolff, *A History of Civilization*; Walter P. Hall, *Europe in the Twentieth Century*; Robert Ergang, *Europe Since Waterloo*; and Gordon Craig, *Europe Since 1815*.

The solution to these problems, conceived by a new department head, envisioned a single semester course in "world history." Although the Academy already taught a course on Europe in a single semester (compared to the two semesters considered minimally adequate at most civilian universities), the thought of a single semester for world history seemed to border on intellectual folly, and it engendered deep concerns among many members of the department who preferred the traditional modes.

A few historians of world civilizations, however, had pioneered a new approach to world history and published initial texts in the field.⁸ Their approach was highly thematic, viewing world history from a special perspective. Interaction between major civilizations had begun with the European voyages of exploration in the 1400s. That interchange led to European control over great areas of the world in the nineteenth century, and fostered the competition between modern Western thought and traditional social organization in other areas of the world in the twentieth century.

Teaching such a course offered several advantages. Its explicit structure allowed the cadet to see beyond facts and dates in world history and to grasp an essential theme. It could be taught in a single semester, and it would allow the department to combine a study of the *essentials* of modern European history and Western Civilization while it introduced cadets to other cultures and civilizations as well. The course, first taught in 1968, was titled in accordance with its new thrust—"Europe and the World Since 1500." The course, strengthened by successive editions of the text, the production of a department coursebook, and the

⁸William H. McNeill's *The Rise of the West* and L. S. Stavrianos' *The World Since 1500* originated the approach. The latter text was the one adopted by the department.

preparation of additional readings, has been taught for more than a decade.

Military History. The study of the origins and development of warfare and the profession of arms had long been taught at West Point as a two-semester capstone course in Military Art in the senior year, and the initial Air Force Academy curriculum included a similar full-year offering. The department realized at an early date, however, that the Military Academy experience was inappropriate to the needs of the Air Force.⁹ First, a lengthy survey of ground warfare with emphasis on tactics could have only marginal value to Air Force officers. Second, it seemed appropriate that instruction in military history, with a new emphasis on the role of air power, should come at an early point in a cadet's preparation so that the cadet might, in the course of a deliberate, in-depth study of the origins of the military profession, consider the special demands that the profession of arms would make on his life. These considerations led the department to an innovative role in the development of military history as a subdiscipline and in the teaching of the subject to sophomore cadets.

As early as 1955, it became evident to the members of the department that to offer a course in military history with an emphasis on air power would be made difficult by the paucity of historical research and writing related to the integration of air weapons in warfare. Even Air Force thinking on the subject had yet to pass beyond the "lessons learned" of World War II. (Whatever lessons the Air Force had distilled from Korea still remained anomalous.) No text incorporated air power into the study of modern warfare. It was thus evident that the department itself would

⁹The early concerns of the department in regard to military history were described by William M. Crabbe, Jr., and David H. Zook, Jr., "Military History at the United States Air Force Academy," *Military Affairs*, 27 (1963), 174-179.

have to take the lead in the research and writing of military aviation history, and produce its own teaching materials.¹⁰

Until 1965, the department's basic course, simply titled "Military History," had been a survey of modern warfare with emphasis on the 20th century, air power, strategy, doctrine, weapons, organization, logistics, and tactics. The greatest emphasis in teaching was on World War II, from which experience the Air Force had derived its organization and confirmed its strategic doctrine. The department initially had to rely on textbooks written by ground-oriented military historians and on a special edition of the West Point campaign atlas.¹¹ This early course, viewed in retrospect, dealt with rather specific aspects of tactics and organization (the movement of troops at Cannae or Cowpens; the composition of Gustavus Adolphus's pike-musket formations). Material on air power was provided by supplemental handouts selected or prepared by the members of the department.

In 1965, the department revised its schedule of core offerings. Cadets previously studied Modern European History, United States History, Military History, and the Area Elective, but in that year the elective was dropped in favor of an additional semester on the history of air power. This change enabled the department to teach a fuller survey of military history, beginning with the ancient world. The

¹⁰For the early departmental concerns for military history, see the *History of the USAF Academy*, 27 July 1954-12 June 1956, vol. I, pp. 546-548, vol II, pp. 783-785; *History of the USAF Academy*, 13 June 1956-9 June 1957, vol I, pp. 205-210; *History of the USAF Academy*, 10 June 1957-11 June 1958, vol. I, pp. 167-182. In 1956, responsibility for military history was assigned to a separate Department of Military History and Geography, but that department was disbanded in 1958 before any courses were taught.

¹¹The most prominent of the texts were R. Ernest DuPuy and Trevor N. DuPuy, *Military Heritage of America*; Gordon B. Turner, *A History of Military Affairs Since the Eighteenth Century*; Lynn Montross, *War Through the Ages*; Richard A. Preston, Herman O. Werner, and Sydney F. Wise, *Men in Arms*; and Walter Millis, *Arms and Men*.

offering of the two-semester course accelerated changes in the character and focus of the core offerings in military history.

To lessen its reliance on ground- and tactics-oriented military history texts, the department decided to write its own text in military history. This text could give air warfare the attention required at the Air Force Academy. It also presented the department with an opportunity to begin teaching with materials reflecting the changes in the sub-discipline of military history in the decade of the 1950s. Military history, maturing as a field, emerged from a narrow and unrespected concern with battles and the conduct of wars to reflect a broader reach for military history as a branch of universal history. As the department received officers fresh from graduate school and trained in this broader conception of military history, its new textbook and its teaching began to emphasize the relationship between warfare and society.¹² Thus, the battles of the Roman Army began to receive less attention than the military institutions of the Roman Republic, which reflected the genius of that state. Similarly, the department "fought" fewer Civil War battles on the blackboard, and concentrated on the general changes in warfare resulting from the industrial progress of the nineteenth century. World War II became a case study in the totalization of war.

This reorientation in military history was evident in 1970 when curriculum pressures led to the reduction of the two-

¹²The transition to the new emphasis was evident in Ray L. Bowers, "The Essence of Military History," in *History and Military Affairs*, 2 vols. (USAF Academy, CO: Department of History, Fall 1966), vol. I: *From Alexander to Frederick the Great*, pp. 1-1- 1-3. Ray Bowers, John Schlicht, Victor Sutch, and Philip Flammer were the major contributors to the military history text project in the 1960s, and Robert C. Ehrhart edited the major revision of 1979. Ehrhart's introduction clearly focused the military history course on warfare as an integral part of civilization; see *Modern Warfare and Society*, 2 vols. (USAF Academy, CO: Department of History, 1979), I, v-vii.

semester course to a single term. The new course, covering military history from the eighteenth century to the Vietnam and Arab-Israeli Wars, bore the title "Modern Warfare and Society." Department readings became as prominent as the course's texts, and by 1978 the department coursebook, completely aligned to match the course theme, had replaced all the outside military history texts except one monograph on World War II.

As now taught, the military history course strengthens both the educational and professional orientation of cadets. The course is firmly *historical*, matching in scope and thrust the advanced teaching in the field at civilian universities. Cadets learn more about American and world history by concentrating on one aspect—the military—of the societies and periods previously introduced. And the course is firmly *professional* in that it addresses the origins and development of armed forces and air warfare.

History of the United States. In the initial offerings by the history department, a full-year survey of United States history was required of juniors, but by 1960 the offering had changed to a single semester for freshmen. The survey, designed to build on high school coursework in American history, sought to ground the cadet firmly in an understanding of his own nation and its institutions, origins, and ideals as he embarked on a career in its service.

Freshman American history used standard survey texts widely employed in many colleges and universities, and the faculty taught the course in a traditional manner.¹³ During the 1960s, however, many cadets expressed a dissatisfaction with the course because it seemed to repeat survey material which they had recently had in high school.

¹³The texts included John D. Hicks and George E. Mowry, *A Short History of American Democracy*; Samuel E. Morison and Henry Steele Commager, *The Growth of the American Republic*; and Richard N. Current, T. Harry Williams, and Frank Freidel, *American History: A Survey*.

By 1970 the department redesigned its core course in American history, offering in that year "The United States in a Changing World: Critical Issues." It included two particular innovations. First, the course was offered to juniors, enabling them to address their own history with new perspectives imparted by other Academy studies in world and military history, philosophy, and political and social science. Cadets expressed greater satisfaction with the junior-year course. Second, the survey approach was abandoned in favor of a thematic examination of certain issues in American society such as Puritanism and moral values, "Manifest Destiny" or mission, sectionalism, and industrialization. The department happily found a stimulating text to support the issues approach.¹⁴ Unfortunately, the course was not required of *all* cadets; it was a "core option" with the "Defense Policy" course offered by the Department of Political Science.

The "Critical Issues" course endured for nine years, until another curriculum revision led to a change in the program. Beginning with the class of 1980, American History was again required of all cadets, but it was reduced to a half-semester. Given the brief length of the course, it now covers only the twentieth century; again the adoption of a pioneering textbook—one which traces the history of the century through the impact of change on families—has led to a favorable cadet acceptance.¹⁵

The forced reduction of the core course in the history of the United States to a half-semester could be justified by the fact that cadets, from high school preparation and study of the United States in other departments, did possess a greater understanding of their nation than their future profession or

¹⁴Carl Degler, *Out of Our Past*.

¹⁵John G. Clark, David M. Katzman, Richard D. McKinzie, and Theodore A. Wilson, *Three Generations in Twentieth-Century America: Family, Community, and Nation*.

the world arena. Unfortunately, it appears that the teaching of United States history at the secondary level is no longer required in some states. It is difficult to conceive how the values of American officership can be perpetrated within the officer corps with only the barest study of the roots of American society to underlie them.¹⁶ Meeting the needs of the Air Force officer corps within the confines of a half-semester offering provides a substantial challenge for the department over the next decade.

In considering the efforts of the department to develop a meaningful sequence of core courses for all cadets, it is interesting to note that the Academy maintained and strengthened its core offerings at the same time that most universities dropped most requirements for surveys. Visitors to the department from the historical profession have often remarked the Academy's experience in retaining surveys, and they have recommended that the department share its experience with the historical profession as it reconsiders its basic teaching posture. A project to explain and describe the department's world history survey through the medium of a faculty research report will be completed in 1979.¹⁷

It is worth noting that while all core courses have specific relevance to the military profession, each one affords the cadet an opportunity to grasp the broader meaning of history. Each course presents the past to the cadet in an original way; he may learn to consider the past (much of

¹⁶The concept of the "complete identity of American military forces with the character of the [American] people" is developed by S. L. A. Marshall in *The Armed Forces Officer*, AFP 190-3 (Washington: Armed Forces Information Service, 1975), pp. 1-9. Specific themes which should be addressed in a program of American studies for future officers are noted by Donald F. Bletz, "The Modern Major General," in *The System for Educating Military Officers in the United States*, Lawrence J. Korb, ed., Occasional Paper no. 9 (International Studies Association, 1976), pp. 3-6.

¹⁷*World History in Liberal Military Education*, Thomas F. McGann and Donald M. Bishop, eds. (forthcoming).

which was "covered" in his earlier schooling) with new paradigms, with attention to new issues. History instruction, even in the core surveys, thus imparts new perspectives and helps cadets learn to develop new processes of inquiry.¹⁸

Advanced Courses in History

Since the formation of the department, its members have believed that some cadets could study history beyond the offerings in the core curriculum, and thus take into the Air Force the expertise and values which advanced study in the discipline provides. Complementing the courses required of all cadets in the core curriculum, therefore, have been advanced offerings in history, developed and offered as the USAFA curriculum provided more scope for individual programs of study. The courses can be grouped in the three major areas discussed previously—world and area history, military history, and United States history. Many advanced courses parallel offerings in history at colleges and universities nationwide. Others represent Academy innovations, unique contributions to the development of history education in the professional military environment.

Specific area courses have been the backbone of advanced offerings in world and area history. Courses covering the history of Russia, the Middle East, Asia, and Latin America date from before 1960. English history and the history of Sub-Saharan Africa were both offered for a number of years. The department's expertise in European history, utilized in the core from the Academy's beginning, enabled the teaching of advanced offerings in Western Institutions and Ideas and

¹⁸The department's courses thus address the key concerns of Samuel H. Magill's "liberal education redefined"; see his "The Aims of Liberal Education in the Post-Modern World," *Liberal Education*, 63 (1977), 438-440.

European Diplomatic History. The latter course evolved by 1973 into a two-semester European History survey.

A special subject in which the department developed expertise is the history of science. Given the technological orientation of air warfare and the role of science in modern life, an offering in the history of this subject seemed especially appropriate for the Air Force Academy. The History of Science was first offered in 1967 by a member of the faculty holding dual appointments in history and in electrical engineering. In 1971, the course included the history of science and technology; in 1977, reflecting the professional orientation of the department, it became "Science, Technology and Warfare."

Advanced courses in military history did not appear until the early 1960s. The first course was simply entitled "Advanced Military History," but from the outset the course dealt with the subject matter described by its later, more accurate title, "History of Military Thought." As cadets were able to deepen their understanding of military history, it was logical that they focus on military thought and the work of key strategists—Machiavelli, Frederick the Great, Clausewitz, Mahan, Douhet, and Mao to name a few—whose intellectual analysis of war influenced its evolution. The course in military thought was soon complemented by other offerings in civil-military relations and air power.

In 1964, a course on the new area of "Unconventional Warfare" inaugurated an offering which has endured to the present. The course sought to examine the phenomenon of insurgency from a broader, more rigorously historical perspective than the shallow "Counterinsurgency" instruction adopted by the armed forces as they entered the Vietnam conflict.

The course on air power deserves special mention. From the beginning, instruction in the core integrated the history of air power into general instruction in the area of military history. Especially after core military history became a single-

semester course, the teaching of the history of the employment of the air weapon became too brief. The department therefore decided to offer a full-semester advanced course solely devoted to air power, emphasizing theory, doctrine, and the major developments in tactics. The course attempted to give cadets a thorough understanding of the Air Force's mode of warfare and sought to provide them a foundation to be the air power innovators of the future.

In 1974, the publication of a new work in military history, Russell Weigley's *The American Way of War*, prompted one department member to offer a special topics course. The course proved so worthwhile that it subsequently became a regular offering of the department. The course focuses on an issue: whether the United States developed a distinct method to its warring—a method which emphasized the attainment of "victory" through direct offensives against enemy power, in which American forces would dominate by weight of firepower and materiel. A course designed around examination of such a thesis proved attractive because it could culminate study of both military history and American history for the cadet; it is now a capstone course for all senior history majors in the American, general, and military tracks.

It is interesting to note that as the courses in military history have developed and matured, they have become a vehicle for two important concepts. The first is that the conduct of war by the United States has been strongly influenced by the particular men called by the nation to high command. Each course has thus developed a strong leadership emphasis. The second relates to the concept, attributed to Giulio Douhet, that "Victory smiles upon those who anticipate the changes in the character of war, not upon those who wait to adapt themselves after changes occur." The courses in air power, military thought, unconventional warfare, and the American way of war address the problem of coping with the numerous changes in the character

of war in modern times. The study of military history will hopefully lead the best cadets to consider these changes in the spirit of Douhet's quotation by questioning not only weapons, organization, tactics, and strategy, but also the paradigms and assumptions that underlie them. The department thus believes that its military history offerings, considered as a whole, are among the most innovative undergraduate courses offered at any institution in the United States, measured both by the standards of the historical profession and by their relevance to the needs of the armed forces.

The advanced course in the field of United States history which has had the longest run (twenty-three consecutive years to date) is the traditionally popular "American Diplomatic History." Not until 1966 was a second advanced course, "Great Issues in American History," offered. The "Great Issues" courses changed its focus in 1970, becoming "American Institutions and Ideas."

Reflecting the emergence of social history and the importance of social concerns, the department inaugurated an offering in the "History of Minorities" in 1971. The first such course offered at a service academy, it enjoyed substantial enrollments for half a decade. In the late 1970s, however, enrollment began to wane. Changes in the Academy curriculum which reduced the total number of electives were one source of the decline, but the lessening of social tension in the late 1970s was probably a more important factor. (The department's course in the history of Sub-Saharan Africa similarly declined in enrollment.)

In 1978-1979, therefore, the courses in "American Institutions and Ideas" and "History of Minorities" were combined into a single offering, "The American Way of Life." The course again recognized the emergence of social history within the discipline and drew on the social content of the two earlier courses. Perhaps reflecting the resurgence of interest in "identity" which marks the late 1970s, a new

course, "Regional History of the United States," was offered the same year. The course had a unique feature; the history of a different region of the United States was to be taught each year; the South in 1979; New England in 1980; and so on.

In addition to the courses generally grouped into the areas described above, the department's offerings have included three other courses.

When the history major was inaugurated, the department realized the need to provide instruction in historical research, thinking, and writing. At first, cadets in individual readings courses were given a block of instruction on methodology. After 1970, however, the department offered a full course on "Historical Methods" to fill the cadets' need. While the course parallels similar offerings in history at other universities, it is worth noting that its concentration on research skills, logical argument, and effective writing are directed primarily toward improving the cadet's abilities as an officer, not as a historian.

Between 1958 and 1961, and since 1965, cadets have been able to elect an "Advanced Readings in History" course organized on tutorial lines.

Since 1970, the department has offered a "Special Topics" course each semester. Such diverse topics as "The Soldier and the State," "The American Civil War," "The History of Christianity," and "Political Violence and the Military in Latin America," have been offered. The Special Topics have often been coordinated with the department-sponsored Military History Symposia, have also begun to give the department's Distinguished Visiting Professors an opportunity to offer courses in their special areas of expertise, and provided other department members opportunities to teach advanced courses on specialized topics outside the regular offerings of the department. On two occasions, the Special Topics courses proved so successful that they were adopted as regular offerings.

The History Major

When originally established, the Academy offered a bachelor of science degree with no specific major and no elective courses. When the "enrichment" program broke the lockstep pattern of the original curriculum, the department was ready to offer its first advanced courses in diplomatic history and advanced area history.¹⁹ The early offerings reflected the hopes of the members of the department that qualified cadets should be able to enter advanced study in history. A history major seemed particularly appropriate for future officers. The Air Force needed officers who had studied the origins and development of our society, foreign cultures, or warfare. Also, the skills developed by history majors—research, analysis, argument, and writing—would give cadets important background for future assignments.

Further scope was given to individualized advanced programs when the first divisional majors were offered, with cadets able to take an increasing number of advanced history courses to qualify for such early interdisciplinary majors as Western Culture, Humanities, International Affairs, and Military Management. And in 1965, three graduating cadets qualified for majors in history after completing individualized enrichment sequences concentrating in history.

The class of 1966 was the first class to be *required* to complete a major's sequence, and in 1966-1967, history became a formal major available through a normal sequence of courses. By that time, the department offered a full range of advanced history courses.

As the Academy majors-for-all program matured, it became possible for cadets to major in a discipline and a

¹⁹The original rationale for the enrichment and majors-for-all program was reviewed by the Academy Dean responsible for the programs, Robert F. McDermott, in "Creating a Military Academy," *Signum* (Royal Military College of Canada), Special Issue on Military Education, August 1976, pp. 52-57.

specialty within that discipline. Some history majors developed specific area studies specialties in the early 1970s, and in 1973 there were three tracks within the history major—an area specialty, American studies, or general history. In 1977 a fourth track—military history—was added. The response of cadets to the opportunity to take a history major has been consistently positive, with some six to ten percent of the cadets in each class majoring in the subject in each year in the recent past.

The Cooperative Master's Degree Program

When the Air Force approved the development of cooperative master's degree programs for well-qualified graduates, the department eventually arranged to send up to five such candidates to Indiana University each year to complete degrees in area and military history. To give the cadets the necessary graduate work to enable them to complete the program at Bloomington within the time allotted, the department offered graduate-level colloquia in American diplomatic history, European diplomatic history, area military history, and American military history. The courses were offered for seven years, beginning in 1968, until a change in Air Force personnel policy ended the program in 1975. Twenty-four Air Force Academy graduates completed the program.

Planning for a History Faculty

The development of the major in history and the cooperative master's degree program required the department to increase its academic expertise in order to offer a great variety of necessary advanced courses. This necessitated long-range planning for department manning.

Within the department, an officer was assigned duty as personnel officer; needs for almost a decade in the future were charted. Young officers with undergraduate backgrounds in history or related subjects were selected for master's degree programs in history at leading graduate schools. Other officers with advanced degrees obtained prior to commissioning were selected after they had performed well in their initial Air Force assignments. Instructors on their first tour were selectively sent for Ph.D. training. As of this writing, eleven (34%) of the officers in the department have the Ph.D. degree, a percentage higher than the faculty average and well within the faculty objective of twenty-five to forty percent.

Recent developments have made this personnel planning more intricate. Limited funds for Air Force-sponsored civilian graduate schooling have increased the need to find suitable officers who obtained degrees without official Air Force sponsorship. The nation's commitment to affirmative action required extensive searches for qualified officers. As well, the need for officers to maintain expertise in operational fields has meant assignments to such duty must intervene in an officer's career between an initial Academy tour and subsequent Ph.D. training and reassignment to the department.

The vigor and diversity of the department have also been strengthened by the assignment of an officer from the Royal Air Force and the U.S. Army each year since 1967. A Foreign Service officer taught in the department from 1975 to 1978, and the first Distinguished Visiting Professor, a member of the faculty at the University of Texas, taught during 1978-79.

Supplemental Teaching Materials

Another special effort of the department has been the development of teaching materials for its own courses.

From the 1950s, the department realized that cadets face extraordinary demands on their time. Responding to the need to make each of a limited number of hours of study as effective as possible, the department developed cadet notebooks in most basic courses. The cadet notebook consisted of overviews, class objectives, reading and discussion questions, and lists of the most important identification terms. By reviewing the cadet notebook before reading an assignment, the cadet could identify and concentrate on the important concepts in the lesson. The notebook system, revised and expanded, is currently used in the world and military history core courses.

A more difficult problem has been the need for the department to develop teaching materials in the field of military history. Available texts in the field have generally not proved to be completely satisfactory for the department's needs, and course chairmen have had to identify and reprint a wide variety of supplemental material for course use. In two instances, the department has regularly published its own anthologies of readings, *Air Power and Warfare* and *Unconventional Warfare*, and it has written its own text, *Modern Warfare and Society*.

The Product: Graduates and Faculty

Measuring the educational and military accomplishments of the department is difficult, especially when the measurement must be related to the objectives of historical study, which are largely intangible.

In numbers, the department has taught up to four core courses in history to 12,134 graduates in the classes of 1959 through 1978. Since the class of 1965, 721 graduating cadets have earned majors in history. As a measure of academic achievement, three of these majors won Rhodes scholarships, and others have won Fulbright, Olmstead, and similar fellowships.

Any measure of the total contribution of these history majors to the nation must be judged in terms of their military careers. Most are still junior in rank, and their major contributions lie in the future. At present, however, it seems proper to mark the lieutenant, a history major and Indiana M.A., who won the Air Force Cross for extracting Marines from Koh Tang Island during the *Mayaguez* incident; the graduate who took an early enrichment sequence in history, won seven Distinguished Flying Crosses in Vietnam, received a Ph.D. in Eastern European history, taught at the Academy, and is now a Vice Wing Commander in the Tactical Air Command; and another graduate of the enrichment program with two Silver Stars who received a prestigious pre-doctoral fellowship from Princeton, wrote an acclaimed book, published by Cambridge, on the system of Moslem-Christian naval warfare in the sixteenth century, taught in the department, and participated in the helicopter evacuation of Saigon on a subsequent tour in Thailand.

Any evaluation of the contribution of the department to the Air Force must include not only cadets, but instructors as well. Since 1955, more than seven score officers have served in the department; the great majority were reassigned to positions that made good use of their education in their operational fields. Compared to normal promotion percentages, an unusually high number have been advanced to the grade of colonel. A former Russian history instructor is now a general officer commanding the first wing to receive the F-16; other department veterans are in top-level planning assignments; a number have served as attaches in such countries as Czechoslovakia, Indonesia, and the United Kingdom; others have served on the faculty of the National, Industrial, Army, Naval, and Air War Colleges; three have successively served as editor of the Air Force's professional journal. The return of department members to the operational Air Force has subjected them to the hazards of the profession of arms. One died in action in Southeast Asia;

two more are "presumed dead," including one officer who was one of the most promising Latin Americanists and military historians of his generation.²⁰

The Quality of the Officer Corps

The work of the department on behalf of the military profession over twenty-five years extends beyond teaching, the education of graduates, and the return of faculty to the operational Air Force. The department has always regarded the Academy as an institution from which the Air Force receives not only "regular officers" to fill the service's "personnel requirements," but also as a repository of expertise and dedication which will influence the quality of the Air Force as a whole. Thus, much of the department's work has been directed toward helping to improve the quality of the officer corps.

Much of the special dedication of the members of the department in its early years was devoted, for instance, to the effective teaching of the origins, development, doctrine, and impact of air power. Those instructors were seeking to overcome the influence of years of control of the Air Force by other services, and to give the new Air Force a distinct identity by producing officers who were dedicated to excellence in the use of military power in its aerial dimension. This is, of course, a continuing goal of the department.

Similarly, the efforts of the department in the core course in world history represent a conscious effort to influence the perspective which every Air Force Academy graduate will have of foreign societies. The structure of the course was adopted in order to expand the cadet's view of the world

²⁰Captain William L. Richardson, Colonel Norman D. Eaton, and Colonel David H. Zook, Jr.

beyond the possible ethnocentrism which the narrower study of American history or Western civilization often imparts.

Another measure within the department relating to the quality of the officer corps is the teaching of the history of science and technology in both basic courses and the advanced course. Both aim at giving the cadet a perspective on modern change and its impact on society which is not necessarily a part of formal education in scientific disciplines. Another qualitative effort has been the emphasis on the development of communicative skills—written and oral—in all history courses.

Other efforts to affect the quality of the officer corps have been more personal. The department has always emphasized that individual instructors are free to give their own teaching a personal stamp by relating their instruction to areas they came to consider important in their Air Force service. Two occasions when this personal dedication and direction had especially important results are worth noting.

In the 1960s, racial tensions within American society had an inevitable impact within the armed forces, and in retrospect it is evident that not enough Air Force officers possessed the perspective and understanding necessary to prevent problems. The Air Force's new needs were felt acutely within the department. Two officers embarked on lengthy historical research on the development of race relations in the Air Force; another officer published a significant series of articles on race relations training in the *Air University Review*. The department's most significant effort, however, was the development of the course in the History of Minorities. In these actions, dedicated members of the department worked to infuse the officer corps and the Air Force with more officers who were better prepared to confront human relations problems in the short run, and to integrate human relations concerns into the leadership of the future.

One final qualitative effort deserves mention. By 1972, almost every member of the department had served in South-

east Asia. The convergence in the department of such a body of combat experience of course led to a process of study, reflection, and debate which grew during the first part of the decade and culminated in the two years following the fall of Saigon in 1975. One set of beliefs that emerged in the department as a result of this vital period of intellectual inquiry was that the failure of American arms resulted at least in part from professional deficiencies among the officers of the armed services. Lacking a sound intellectual grasp of the influence of nationalism within foreign societies and the nature of unconventional war, they relied on the standard formulae of conventional war. In contrast to highly developed programs and accomplishment in the *technical* aspect of war, they gave insufficient attention to its *human* dimension.²¹ The end of the war did not remedy these deficiencies, which may yet influence the armed forces of today. The result for the department has been a commitment by many instructors to lead cadets to examine these problems in history courses, and to consider how the officer corps might collectively overcome them.²²

²¹These concepts can be traced through the writings of members of the department, who in addition addressed problems affecting the entire military establishment. See Richard E. Porter, "Making Sense of Vietnam," *Air University Review*, November-December 1976, esp. pp. 94-97; David H. Price, "Unravelling Vietnam" unpublished ms; Donald M. Bishop, "American Forces in Foreign Cultures," *U.S. Naval Institute Proceedings*, April 1978, p. 46, and review of *Crisis in Command*, by Richard A. Gabriel and Paul L. Savage, in *Air Force*, October 1978, pp. 114-115; and David MacIsaac, review of *The Lessons of Vietnam*, by W. Scott Thompson and Donaldson D. Frizzell, in *Air Force*, December 1977, pp. 36-37, and his review of *The War Managers*, by Douglas Kinnard, in *Air Force*, February 1978, p. 73. Also, compare John F. Shiner "Vietnam 1965-1973: A Campaign Survey," in *Modern Warfare and Society*, 2 vols. (USAF Academy, CO: Department of History, 1977), II, 35-1, with Robert C. Ehrhart, "Vietnam: Analysis," in *Modern Warfare and Society*, 2 vols. (USAF Academy, CO: Department of History, 1979), II, 31-1-31-5 and 31-10-31-11.

²²Major John F. Shiner expressed the need for renewed professionalism in his "The Military Professional in America," in *Modern Warfare and Society*, 2 vols. (USAF Academy, CO: Department of History, 1979), pp. 33-1-33-14.

Serving the Historical Profession

Earlier in the article we alluded to the idea that members of the department serve two professions, arms and history. It is indeed its expertise in the latter field that gives the department its place in the faculty.

In discussing the accomplishments of the members of the department as historians, it seems relevant to divide its activities into three areas generally used within the historical profession for tenure decisions—teaching, research, and service.

Teaching. While the research accomplishments of the Academy faculty are substantial, there can be little doubt that the Academy possesses a *teaching* faculty which excels at the effective instruction of undergraduates. All teaching takes place in small sections of fifteen to twenty-two cadets; the normal teaching load for an instructor is four sections, or about 80 cadets. (Occasionally, up to 76 cadets are gathered into the Academy's specialized "lectinar" classrooms to hear instructors with specialized expertise or to receive presentations of materials using the lectinar's audio-visual capabilities.) Teaching styles in the department vary, but usually the instructor guides the cadets through a body of material, with substantial discussion.

The department's teaching is enhanced by the formal designation of supervisory course chairmen and by regular meetings of instructors in bloc conferences at which possible approaches, background reading materials, and effective techniques are shared. Instructors, however, are completely free to approach a lesson or a course in any manner they believe worthwhile; there are no "school solutions" in the teaching of history courses.

Instructors are encouraged to visit one another's classes, and it is the normal practice for instructors to sit in on a complete course before becoming an advanced course chairman. New instructors in world history attend a workshop conducted before the onset of the autumn term; the work-

shops include presentations by experienced members of the department and by a distinguished teaching historian from a major university.²³

Judging the cadets' response to the department's teaching of history is somewhat difficult, but some indications are evident from the results of end-of-course critiques. In the last decade, approximately three-quarters of all cadets have rated their history courses, in comparison to previous history courses, as "above average" or "outstanding." More gratifying has been the number of cadets—sometimes up to twenty percent of a core course enrollment—who have stated that the department's courses changed their opinion of history in a positive direction.

Complementing the department's teaching is the relationship of history instructors and cadets beyond the classroom. The Cadet History Club, the second largest of the club activities at the Academy, sponsors dinner meetings with guest speakers and field trips to historic sites. Members of the department working part-time with the Athletic Department and the Commandant of Cadets led the way in helping the Athletic Department establish the intercollegiate lacrosse and water polo programs and the rugby club; other members have coached teams in these sports as well as baseball, basketball, tennis, handball, and soccer. Each year several officers contribute to the commandant's military training programs as associate air officers commanding and as ethics advisors. All new officers in the department have been required for several years to join the summer Basic Cadet Training cadre to train the incoming class of freshman. The department has chaired and manned the summer course in small unit tactics. About half of the department members are pilots and navigators; almost all have flown in the airmanship, pilot, and navigation instruction programs.

²³These historians have included William McNeill, Leften Stavrianos, Peter Sugar, John Thompson, and Howard Mehlinger.

Research. Many department members have found their assignment an opportunity to conduct research and to publish. Many have made substantial original contributions to knowledge. This contribution has focused on the fields of area studies, warfare and society, and air power. To support their work, some have won prestigious fellowships ranging from a Guggenheim to that of the Woodrow Wilson Center. Another officer received a fellowship to live and study at Moscow State University in the Soviet Union. Department members have presented papers before the leading professional meetings. Other officers have contributed articles on professional topics to the various military and professional publications.

In formal terms, department members have published eighteen books and more than sixty major journal articles, essays, and encyclopedia articles. The books include several contributions to Latin American, American, and English history, and several works in military history—a study of knight-service in medieval Europe; a biography of Henry II Plantagenet; an original economic, technical, and social analysis of naval warfare in the Mediterranean in the age of transition from oar to sail; a biography of General Santa Anna and a study of early Spanish campaigns in the Southwest; a fresh study of Billy Mitchell; the most comprehensive study of World War II strategic bombing theory and analysis; the basic historical work on air navigation; the only historical study of liberal education in American service academies; and two books on the experiences of American Blacks in the Air Force from World War II to 1964.²⁴

²⁴The books published by members of the department are as follows: A. F. Chew, *An Atlas of Russian History: Eleven Centuries of Changing Borders and The White Death*; David I. Folkman, *The Nicaragua Route*; John F. Guilmartin, Jr., *Gunpowder and Galleys: Changing Technology and Mediterranean Warfare at Sea in the Sixteenth Century*; Alan Gropman, *The Air Force Integrates, 1945-1964*; Alfred F. Hurley, *Billy Mitchell: Crusader for Air Power*; Oakah L. Jones,

During the war in Southeast Asia, the department was called upon to use its expertise in the direct documentation of the air war. Eighteen members of the department performed temporary duty or served tours in Vietnam as members of Project CHECO (Contemporary Historical Evaluation of Current Operations). The department expanded the resource base of the program by inviting members of other faculty departments as CHECO writers; another member of the department commanded the CHECO headquarters at Tan Son Nhut Air Base in Saigon for a year. History department members wrote or co-authored thirty-one classified descriptive monographs on such diverse Air Force efforts as the use of remote sensors, riverine operations, reconnaissance, B-52 strikes, airborne signals intelligence, Vietnamization, command control, and studies of the battles at Ban Phanop and An Loc. (The other writers brought the total to over one hundred monographs.) The use of trained historians in recording significant operations enhanced both the quality of the CHECO reports and their value to future historians of the war.

Service. The department's major contribution in the area of "service" has been, of course, the education of graduates and the improvement of the quality of the officer corps. Beyond that general charge, members of the department have been officers in historical associations and local educational organizations. A number of conferences, ranging from two

Pueblo Warriors and Spanish Conquests, and *Santa Anna*; Alan M. Osur, *Blacks in the Army Air Forces during World War II: The Problem of Race Relations*; David MacIsaac, *The United States Strategic Bombing Survey*; Paul T. Ringenbach, *Tramps and Reformers, 1873-1916: The Discovery of Unemployment in New York*; John Schlight, *Monarchs and Mercenaries: A Reappraisal of the Importance of Knight Service in Norman and Early Angevin England*, and *Henry II Plantagenet*; William E. Simons, *Liberal Education in the Service Academies*; Monte Wright, *Most Probable Position: A History of Aerial Navigation to 1941*; David H. Zook, Jr., *The Conduct of the Chaco War*, and *Zarumilla-Maranon: The Ecuador-Peru Dispute*; and (with Robin Higham) *A Short History of Warfare*.

sponsored by the National Archives to the Western Conference of the Association for Asian Studies, have been organized and hosted by members of the department. A series of National Defense Colloquia among members of the Academy departments of Political Science; Economics, Geography, and Management; and History, as well as meetings with local history departments have been organized under department auspices. And the department played a leading role in the American Bicentennial and the Academy's 25th anniversary celebrations.

The department has also played a substantial role in the development of one of history's important subdisciplines—military history. Two particular initiatives to stimulate its growth have borne fruit.

Beginning in 1959, the department sponsored the series of annual Harmon Memorial Lectures in Military History. Named for the Academy's first superintendent, the Harmon Lectures have provided an opportunity for distinguished military historians to present important analytical lectures to cadets. In the fashion of endowed lectures at Oxford and Cambridge, the presentations are published and widely distributed. Because many of the lectures have presented compact syntheses of larger issues or have presented the major points of work yet to be published in book form, copies have been in great demand. An invitation to give the Harmon Lecture is now recognized as one of the premier accolades in military history.

An even greater contribution to the field has been the ongoing Military History Symposia, held since 1967. In contrast with many other historical specialties, military historians had no established forum at that time for the presentation of papers and the criticism of work. Since this helped retard the progress of historical research, the department decided to host, in cooperation with the Academy's Association of Graduates, professional meetings for military historians. Each symposium after the first has been organized

around a key issue within the field, enabling the publication of a proceedings volume by the Government Printing Office on each theme. Topics have included *Command and Commanders in Modern Military History* (1968); *Science, Technology, and Warfare* (1969); *Soldiers and Statesmen* (1970); *The Military and Society* (1972); *The Military History of the American Revolution* (1974); *The American Military on the Frontier* (1976); and *Air Power and Warfare* (1978). The symposia have brought together approximately 250 conferees from outside the Academy each time.

The Contribution of History to Officer Formation

The activities and accomplishments of the Department of History, from the excitement of the first officers to the present, have all been directed toward the development of Air Force officers. Within the Academy program, history contributes to the basic process of education. It emphasizes the development of reasoning ability, the appreciation of how the past influences human affairs, and the ability to explore issues with a perspective informed and made more penetrating by historical inquiry. History instruction accomplishes these educational goals within a framework of core and advanced courses adapted to the needs of officers. History's concerns, however, reach beyond education. The discipline contributes to military training as well.²⁵ American officers, for instance, should derive their leadership philosophy from the unique values that the American historical experience

²⁵The issue of "education" and "training" in the Academy program was explored by a member of the department, Monte D. Wright, in his "In Defense of the Terrazzo Gap," *Air Force*, April 1975 pp. 38-40, and in his "Military Education and Military Training: The Value of a Dichotomy," *Signum* (Royal Military College of Canada), Special Issue on Military Education, August 1976, pp. 95-100.

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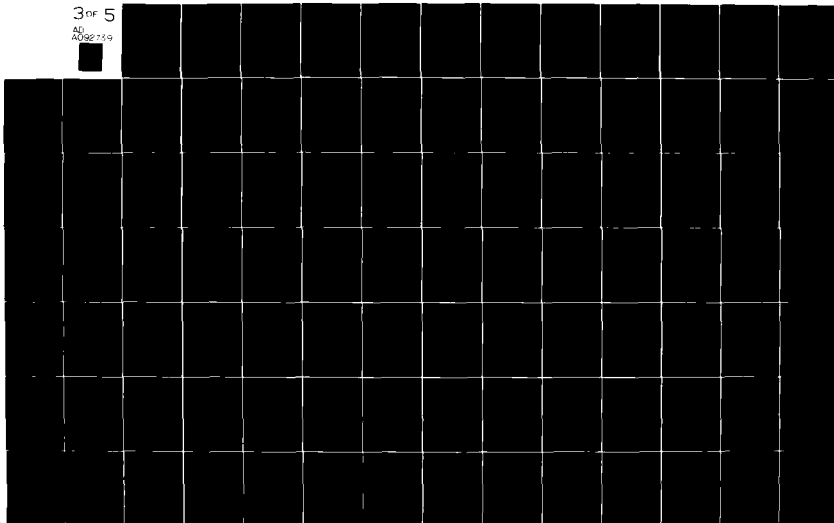
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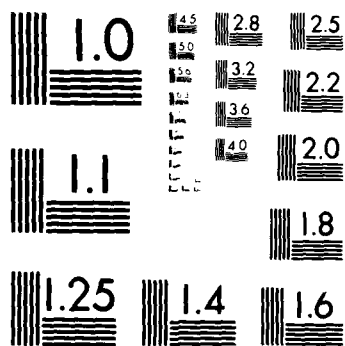
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provides. The corporate identity of the Air Force officer corps rests on a distinct historical experience. And in examining historically the issues of leadership, professionalism, commitment, and discipline in the military tradition, history education supports a larger process, the formation of military character.

CHAPTER 13

DYNAMISM AND DISCIPLINE: The Role of Philosophy at the United States Air Force Academy*

"The professional military mind is by necessity an inferior and unimaginative mind; no man of high intellectual quality would willingly imprison his gift in such a calling."¹

The quotation above expresses quite forcefully a conception of the "military mind" which can be found in many literary characterizations of the military officer, some fictional and some non-fictional. Additional descriptions of such a mind find it to be conservative, disciplined, unconcerned, uninformed, and surprisingly enough, morally insensitive. The last characteristic is attributed to the "garrison mind" by Murray Kempton who states that "... the good soldier will lie under orders as bravely as he will die under them. The garrison mind can produce acts that are honorable and even gallant; but notions of high virtue and selfless service seldom intrude upon it, being disposed of by discipline."²

*This article by Colonel M. M. Wakin first appeared in *The New Scholasticism*, 41 (Summer, 1967), 336-66 and is reprinted here with permission. An update follows.

¹This quotation from H. G. Wells's *Outline of History* was cited recently by Air Force Secretary Harold Brown in a commencement address at the Air Force Academy. Secretary Brown's position was, obviously, antithetical to that of Wells.

²M. Kempton, "Ribbons and Bibbons," *The New Republic*, November 30, 1963, 14.

I have pointed out this particular and perhaps popularized view of the intellectual and moral abilities and attitudes of military officers since it is clear that the institutional goal of the Air Force Academy is directly opposed to the production and preservation of officers who fit the "military mind" stereotype. It has seemed to me particularly paradoxical that the attitude which creates the stereotype described above must assume that the qualities of obedience and loyalty which we esteem greatly in young people, particularly in our own children, when they are ascribed to career military officers, are assumed to be in some sense necessarily conjoined to stupidity and moral laxity. The villain in the case seems to be discipline. If I analyze the deprecating attitudes correctly, they hold that, in brief, discipline and dynamism do not mix; a mind which readily and habitually obeys orders can hardly be thought to be either brilliant or creative. The aim of the Air Force Academy, as I conceive it, stands in sharp contradiction to the previously described view; we hope to graduate dedicated officers who are intellectually gifted, broadly educated, morally resolute, and capable of mature leadership under the most trying conditions.

What kind of a curriculum can satisfy that aim? What should be the role of philosophy in an institution where it is held that military leaders can and ought to be thinkers as well as doers? As a former Dean of the Faculty at the Air Force Academy³ has pointed out, there are two major functions which the curriculum must serve. It must offer those courses which our students should study because they are, first of all, men. These courses should be in the liberal arts and sciences; this portion of the curriculum should insure a broad and

³Brigadier General Robert F. McDermott, to whom goes much of the credit for the early directions of the academic curriculum. General McDermott pioneered such innovations in military education as the enrichment program, cooperative graduate programs, majors for all students, and a "whole man" selection process for incoming candidates.

liberal education. The second function which the curriculum should accomplish concerns the unique professional mission of a military academy; it should provide a number of courses which a student should study because he is going to be a professional military man. Literature, law, physics, and philosophy all fall in the category of those courses which a man studies because he is a man; aeronautics, astronautics, electrical engineering, military history, and other more specific military training courses fall into the professional category.

It is worth mentioning here that military decisions in our time cannot be made in isolated fashion. Military leaders must act from a fundamental knowledge of the political, economic, religious, and yes, philosophical implications of their decisions. It is unthinkable that military problems in Vietnam today can be considered completely apart from the religious, cultural, and philosophical traditions of the Vietnamese. To attempt to find solutions to problems in Southeast Asia today without first attempting to understand Buddhism, Communism, and the relevance of Western value systems is to prejudice in advance any possibility of even a semi-permanent settlement of the unrest in that part of the world. This is not to say that every military leader must be a philosopher; what I am trying to point out is that he must be a student of philosophy in the sense that he first of all understands and secondly does not ignore philosophical positions, both those of his friends and those of his enemies. There is a great deal of relevance in G. K. Chesterton's comment: "We think that for a general about to fight an enemy, it is important to know the enemy's numbers, but still more important to know the enemy's philosophy."⁴

Not too long ago, a visiting colleague suggested that it seemed rather a mistake to teach philosophy to cadets since inculcation of philosophic attitudes would naturally result

⁴G. K. Chesterton, *Heretics* (New York, 1905), p. 15.

in their questioning policies, deliberating over the appropriateness of obeying certain orders, etc. Philosophy would seem to produce more Hamlets than command decision heroes. He suggested that if our students reflect philosophically about their own situations too long we will either have poor soldiers or we will lose them to other professions. This suggestion ought not to be ignored; it quite obviously relates to our earlier references to the "military mind."

Taking our cue from Socrates' dictum that "the unexamined life is not worth living" (hence, we ought to examine our lives), we might say in parallel fashion, "the unexamined ideal is not worth dying for." Since examining ideals is usually considered the business of the philosophers, and since our students at the Academy have taken a rather serious oath to risk their lives for certain ideals, it is difficult to avoid the conclusion that they should do some philosophy. If after examination of those ideals a cadet decides that they are not worth the risk, then we will indeed lose a potential officer—and we should. Fools alone die for nothing; rational men should be able to justify both living and dying.

Valuations of the worth of professions must take into account the essential function of the profession being examined. Our high regard for the medical profession, for example, stems from its basic function to preserve life; life itself is very high on the scale of human values. Our high regard for judges stems from their essential concern with justice, another important human value. If we are to evaluate the military profession in an analogous way we must decide on its essential function. If we can agree that the function of the military establishment of a free nation is to preserve and protect the way of life of that nation, and if we can agree that the way of life is an important human value, "We must value most, not living, but living well" (Socrates, once again), then it surely follows that the military profession is a noble profession indeed. If we are afraid that exposure to philosophy will turn our students against the military pro-

fession, then once more, we must take the risk. It is better to have men in this profession who have rationally evaluated their essential function and decided in its favor than to have an uncommitted corps of officers who might not consider the value commitment involved until that crucial moment of decision which could spell disaster for our nation or even for the human race.

The original planners of the Academy curriculum had included two courses in philosophy which every student would be required to take. That original curriculum was totally prescribed for four years. During the freshman year each cadet was to take a basic course in logic; during the junior year it was proposed that each cadet take a course in value theory. The total prescribed curriculum at that time was equally divided between the humanities and social sciences on the one hand and the basic and engineering sciences on the other. Actually, by the time the first class at the Academy, the Class of 1959, reached the junior year, revisions in the curriculum had reduced the number of prescribed philosophy courses to one. Curriculum planners at that time decided that there should be one required course which would serve as an introduction to a number of philosophic problems rather than be restricted to one field in philosophy. From 1959 through 1961 every junior took a course designed around original readings which encompassed a number of metaphysical, epistemological, ethical, and socio-political problems. At the same time an elective course in ethics became very popular. From 1962 through 1964 each student was able to fulfill the philosophy requirement by electing one of three basic courses, in logic, ethics, or philosophic problems.

These changes in required philosophy offerings were developing along with a gradually evolving overall curriculum. By taking a number of enrichment courses, some advanced students could complete a major in one of four fields: humanities, public affairs, engineering science, and basic

science. As more majors were developed, these evolving changes culminated in 1964 in a shift to a curriculum which provided a major for each student within the normal number of semester hours required for graduation. Majors are now available in 27 different fields ranging from humanities to computer science. The concept of a fundamental core curriculum composed of liberal and professional courses has been retained, however. Two-thirds of the approximate total of the 49 courses required for graduation remain in the core curriculum which continues to maintain the humanities-social science and basic-engineering science balance.

With the majors-for-all innovation came the obvious problem of replacing one third of the required courses with courses in the specialized majors. The philosophy requirement was one of the courses which the science and engineering division were unable to include within the scope of their technical majors. All of the majors in the social sciences have included the ethics course as a requirement and each major offered by the humanities division included two philosophy courses. A number of science and engineering students, however, have elected to take a course in the philosophy of science, in ethics, or in comparative religion.

The philosophy function at the Academy has quite clearly been a "service" function in the sense that large numbers of students receive some exposure to philosophy but there has been no attempt to offer a complete major in philosophy. It is not surprising that courses in ethics and comparative religion should continue to be extremely popular in an institution which must be concerned as much with the development of character as it is with the development of intellect. Explicit recognition of the importance of philosophy in this curriculum was solidified with the appointment of a permanent professor of philosophy in 1964. From the beginning of the institution in 1955, the philosophers assigned to the faculty have been subsidiary members of larger departments; since 1958 the philosophy staff has been attached to the

English department. As a further indication of the institution's recognition of the essential role which philosophy can continue to play in the education of Air Force future leaders, an independent department of philosophy and fine arts will be established during the summer of 1967. A very recent curriculum change approved by the Academy Curriculum Committee and the Academy Board incorporates a prescribed one semester hour introductory course in philosophy in the unique January term for all sophomores, once more assuring that every student will have at least one direct contact with a formal philosophy course.

These latest curriculum innovations present added challenges to the five members of the current philosophy staff. Our function must continue to be one of support for a number of majors. The computer science majors will take symbolic logic from the philosophy staff; the area studies majors will take our offering in comparative religion; a large number of the majors in social science and humanities fields will continue to take the ethics course; American studies majors must have a course in American philosophy; humanities majors are now required to take three courses in philosophy; the philosophy of science course should still appeal to many science and engineering majors. The greatest challenge, however, will be the introductory course for all sophomores which will be taught for the first time in January 1968. Initial plans for this course are to develop considerations of three basic themes; the nature of man, the nature of human knowledge, and the nature of reality. The major task, of course, consists in showing the relevance of these classical areas of philosophical investigation to today's student and today's problems. It is a rather large order to expect to generate enthusiasm for philosophy and to develop philosophical attitudes through a one semester hour course with approximately sixteen meetings, but this is precisely the challenge we face. Interest generated in this course will influence the enrollments in the courses taught during the normal fall and

spring semesters. More importantly, the philosophic attitudes generated in this and the other philosophy courses, should assist each student to come to grips with the human predicament in general and his immediate personal involvements in the military in particular.

A word about the student population and teaching conditions at the Air Force Academy may clarify further the impact which enthusiastic philosophers can have in this institution. All of our students are on full four year scholarships with additional monthly pay, and they are highly selected. The majority of them are eager to tackle philosophical issues and bring with them the broad experiences provided by our balanced core curriculum. During the normal fall and spring semester courses, our class size averages fifteen students which makes the seminar discussion approach the most popular teaching method. Those instructors with a penchant for the Socratic method find our class situation ideal. Our faculty is all military; every officer who teaches at the Academy has an advanced degree in his field; 28% of the faculty have Ph.D.'s. Because our faculty members are officers as well as teachers, they teach by example as well as by lecture. Wearing the uniform enforces the obligation to motivate as well as to educate our student body. We cannot assume responsibility for intellectual development alone but must be continually concerned with character development as well. The existence of this corps of highly educated officers with varied military experience is one piece of evidence that the goal of marrying dynamism with discipline is not altogether ethereal. While our student body can properly be described as exciting, it is not inappropriate to describe our faculty as dynamic and interested, interested in subject matter and most emphatically interested in students.

In this fresh academic atmosphere where the curriculum attempts to incorporate the wisdom of our classical tradition with the latest advances in astronautics and computer science, the philosopher can play both a stabilizing and connecting

role. In the fields of ethics and epistemology he serves as a stabilizing influence, calling attention to our moral traditions and forcing rational evaluation of those principles which wearers of the uniform have sworn to defend. In symbolic logic and the philosophy of science he serves as a bridge connecting the humanities division with the science and engineering divisions. Our philosophers have engaged in these and other functions in a number of ways beyond the normal classroom participation. During the summer we have given brief series of lectures on character development to incoming freshmen. Almost every student-faculty discussion group includes a member of our philosophy staff. Subjects discussed in these sessions have ranged from an examination of the conditions for a "just" war to birth control and current sexual mores. Our philosophers are invited very frequently to present informal papers to the separate cadet squadrons and to the various student organizations which include the math club, the student forum, etc. For a number of years our philosophy staff members have functioned as advisors to the student honor and ethics committees. Our student-oriented approach leads naturally to the sort of relationship that results in many informal discussions with students in our professors' homes.

The courses which are currently offered by the philosophy staff includes the introductory course for all sophomores in the January term, ethics, comparative religion, philosophical analysis, philosophy of science, American philosophy, introduction to symbolic logic, and an independent study course for seniors. All of the courses except the independent study course and the required sophomore course are taught in small sections of approximately fifteen students each. This means that our instructors teach more often than philosophy instructors at most civilian institutions but our total student load would not be considered excessive. We expect to continue the small section discussion approach during the normal fall and spring semesters but the January term course for

approximately one thousand sophomores will have to be taught in large lecture sections. Since this is the one course which provides our philosophers contact with our entire student population, it looms as a most significant challenge.

The role of philosophy in a federal educational institution whose primary goal is to graduate commissioned officers motivated for a lifetime career of service is more complex than the role of philosophy in other colleges and universities. As philosophy professors we share a number of common functions with our colleagues in civilian institutions: we attempt to "humanize" our more technical faculty departments; we hope to stimulate a love for philosophy and significant philosophic problems in our students; we strive to inculcate philosophic attitudes, to encourage serious and rational considerations of issues with ramifications for personal, social, economic, and political life. Our function must be similar to the function of philosophy in other colleges since all of us must deal with the important problems which all students must come to grips with simply because they are human beings. We must foster that natural inclination to "wonder" concerning the nature of reality, the human condition, and the limits of human knowledge. Our function differs from that of our colleagues in other colleges in that we do not plan to graduate students with an extensive major in philosophy. Along with the history, English, and foreign language departments, philosophy and fine arts share the responsibilities of the humanities division for maintaining the strong humanities portion of our curriculum. Majors offered by this division include humanities, history, general studies, military art and science, and American studies. A student with special interests in philosophy could take from two to eight philosophy courses in some of these majors offered by the humanities division.

Additionally, the function of philosophy in the Academy curriculum is particularly significant because of our necessary concern for values and character development. The natural

interests of our students in flying and hence in aeronautics and astronautics could have focused our curriculum in strictly technical directions. Philosophy can continue to assist in providing the balanced background which intelligent leaders must have if our way of life is to survive. The picture of philosophy in our time at the Air Force Academy seems quite the reverse of that painted by Aristophanes who viewed philosophers as men with their heads in the clouds; it is precisely those men who expect to explore beyond the clouds whose attention must be guided to the earthy conditions of human existence by philosophy.

I do not think that it is impossible to attain our idealistic goal of finding in the same men the love of wisdom, ability to accept leadership responsibility, and dedication to country. The student body which comes to us at the Air Force Academy arrives with exceptional potential; philosophy can do much toward developing that potential for intellectual and moral leadership. Because our world and our nation need men of "high intellectual quality" serving as our military leaders, philosophy has an important role to play in this curriculum. If we are to leave the military calling to men with "inferior and unimaginative" minds we must be prepared to accept the consequences of inferior and unimaginative military decisions. The hope for our continuing existence as a free nation or even as a human race could well rest on the possibility of marrying dynamism and discipline.

Update, 1979

In the twelve years since "Dynamism and Discipline" was written, the philosophy program has evolved considerably with even more emphasis being placed on courses in ethics. The short winter term introductory course required of all sophomores was taught only for two years (1968 and 1969) under large lecture hall conditions. By 1970 it was scheduled as a half-semester course in small sections for all sophomores

while seniors additionally were able to fill a core option with either the ethics course or a world literature course. The issues raised by the Vietnam War and the Watergate Affair created significant interest in professional ethics and questions related to morality and war. With a major overall shift in the Academy curriculum resulting from the intensive study of the Twentieth Anniversary Curriculum Review Committee, in 1976 the ethics course became the required philosophy course, offered in the junior year.

The number of philosophy instructors is currently stabilized at ten. For the 1977-78 academic year, the department enjoyed the services of a Distinguished Visiting Professor (Professor Robert Cunningham from San Francisco State University). Upper division course enrollments apart from the required ethics course have declined markedly since 1976 due to the previously mentioned change in the overall curriculum. That change brought about a sharp reduction in the number of free electives available in any student's schedule.

The administrative structure of the department has fluctuated independently of the curriculum offerings. Philosophy was offered by the Department of Philosophy and Fine Arts from 1967 through 1973. An administrative reorganization in 1973 incorporated the fine arts offerings and instructors into the English Department (Department of English and Fine Arts) and combined the personnel and offerings of philosophy and political science (Department of Political Science and Philosophy). In 1977 this administrative action was reversed and the Department of Philosophy and Fine Arts was reconstituted as a separate entity which is operating currently.

Ethics has become a central focus of the philosophy staff in recent years. Philosophy faculty members have published a number of articles on professional ethics and have been treated as a resource by other service schools where they have served as curriculum consultants and guest lecturers. Perhaps the most significant publication of department members is the anthology, *War, Morality, and the Military Pro-*

fession, which was printed locally in 1978 and will appear in a commercial edition in the summer of 1979. The philosophy program at the Academy seems at this point well established in its continuing function of humanizing the curriculum and focusing the attention of present and future military leaders on the serious ethical dimensions of the military profession.

Department of Philosophy and Fine Arts

CHAPTER 14

THE ESTHETIC DIMENSION:
FINE ARTS AT THE UNITED STATES AIR
FORCE ACADEMY*

From the very beginning, curriculum planners at the Academy intended to include the fine arts in the core curriculum. The initial plan included an introduction to some masterpieces of the fine arts in the proposed senior year-long English course. By the time the first class to enter the Academy became seniors, (1958-59), however, curriculum proposals had been revised many times and the fine arts offerings were available as enrichment courses only. A two-course sequence in painting, sculpture, architecture, and music was offered in 1958-59 and the fine arts program was launched.

It is easy to imagine the raised eyebrows generated by the existence of a fine arts program at a military academy. In the early sixties the courses were offered by instructors in the English Department and were taught in a classroom which was built to be a science laboratory. The sculpture projects took place in a converted closet. But there was interest and enthusiasm for the offerings in the arts, offerings which we believe to be essential aspects of the broad liberal education which must complement the technical areas of the Academy curriculum. With our extensive attention to economic man, technical man, political man, literary man, and military man, it would seem an oversight to avoid any contact with creative

*By Lieutenant Colonel Carlin J. Kielcheski, Tenure Professor of Art.

man. Students came in large numbers to learn about creative man—and to express their own creativity.

Should military professionals be schooled in the visual arts and in music? We think so. Imagine the advantages for officers whose assignments take them frequently to other cultures if they know the significant architectural structures and art museums to be found there. Imagine also the case of those military leaders whose understanding of the important national artifacts might temper their judgments in developing tactics in battle areas where these artifacts exist. Our goal is to maintain a sufficient number of balanced courses to provide any cadet an opportunity to take a course in art or music. Cadets, like most other college students in our time, listen to a great deal of music. We offer them the opportunity to understand and appreciate music at levels they would not normally seek out; we offer them the chance to become sophisticated listeners to music that can play an important role in their lives.

With these goals in mind our fine arts offerings have evolved into a series of courses which are in many ways unique. Since the middle sixties, our course introducing the visual arts has provided students an opportunity to analyze major art concepts, artists, and styles. In dealing with the development of art styles, we place emphasis on the esthetic and creative experience. Students do two paintings themselves in that course in order to better appreciate the efforts of the masters they study. In our studio course every student gains some initial experience in design, graphics, painting and sculpture, exploring a variety of media which include woodcuts, etchings, oils, synthetics, wood, stone, bronze, and direct metal. Each semester the art professor selects a very few of the works created by students in the studio course for retention in the permanent collection of cadet art works which are displayed throughout the Academy. By 1979 this permanent collection numbers more than ninety-four cadet projects in a variety of media.

A separate course in music appreciation has been offered since 1962-63, surveying essentially the music of the Western world through a study of basic elements, forms, and styles. Representative works of the major composers receive special attention—the emphasis continues to be on listening, understanding, and appreciation. A special course in American art and music, team-taught by the art and music instructors, was developed in 1966-67 to complement the courses in majors concentrating on American history, politics, or literature. For students with extensive backgrounds in art or music, an upper-division independent study course may be taken under the singular guidance of an art or music instructor. Highlights of the work done in this independent study experience include some excellent original compositions for piano and organ as well as some major murals which permanently adorn prominent walls in the academic building. We should note additionally that each of the courses taught in fine arts includes at least one field trip to a major art museum or music concert.

The facilities available for fine arts at the Academy today are magnificent. When a major building expansion was completed in 1968, it included a painting studio, a sculpture studio, and a music studio. All three studios are well equipped. The music studio combines a classroom environment with superb stereo listening equipment and a Steinway baby grand piano. The sculpture studio boasts a bronze casting furnace, pottery wheels, a kiln, welding equipment, and all associated implements. We have been blessed with talented instructors. Since 1967 enrollments have justified a full-time art instructor and a full-time music instructor; in the middle seventies the student load reached as high as 178 students in art and music electives in a single semester.

As the Academy reaches its 25th anniversary, there is some concern for maintaining these offerings in art and music at their previous levels. A major curriculum revision effected in 1976 succeeded in balancing overall cadet work loads,

but one of its results now being felt severely in the fine arts program has been the shrinking of open option electives in most majors. In the academic year 1978-79, enrollments in art and music courses have decreased to one-third of the numbers electing these courses in 1975. We are exploring initiatives which should reopen opportunities for students to elect fine arts courses freely and in large numbers. The role which the fine arts play in broadening and humanizing the Academy curriculum is too valuable to risk losing.

The administration of the fine arts program has been coupled with two other disciplines in the Humanities Division. Along with the philosophy courses, fine arts courses were offered in the English Department until 1967. From 1967-73 the fine arts faculty were affiliated with the Department of English and Fine Arts, and again from 1977 with the Department of Philosophy and Fine Arts. The departmental combinations were strictly administrative; course offerings in the fine arts have retained their autonomous character as described previously and have been taught by faculty members with exceptional credentials in art and music.

The fine arts faculty has not been exclusively student-oriented. For more than twelve years it has provided special programs in art and music for faculty and staff members. Its "Noontime Arts Program" has provided a monthly experience in music, drama, or poetry which enriches the entire Academy community. Our music professor traditionally assists the cadet drama society with its annual musicals and also provides services to the Academy Preparatory School. Our art professor offers at least annually a noon-hour art course to faculty and staff members which has been a most popular and appreciated opportunity for all to become involved in the arts. Additionally, the department sponsors or provides art exhibits at the Academy three times during each academic year.

From its simple beginnings in makeshift closet-studios, the fine arts program has evolved into a major influence on

the way of life at the Air Force Academy. Perhaps it gives testimony to the real possibility of blending in potential military leaders a balance of the esthetic values with the ethical and intellectual dimensions necessary to sustain the highest standards of the profession.

Department of Economics, Geography, and Management

CHAPTER 15

PERCEPTIONS OF THE ECONOMICS DISCIPLINE
AT THE ACADEMY OVER TWENTY-FIVE YEARS*

While the curriculum for the Air Force Academy was still being planned, courses in economics were deemed necessary for cadets to broaden their educational experience. To this end, the Air Force Academy Planning Board in May of 1949 prescribed a three-hour course in the "Principles of Economics" and a five-hour course in "Governments and Economics" (Comparative Systems). Both were to be taught as upper division courses during the cadets' first (senior) and second (junior) class years. The primary objectives were to provide an understanding of "problems of economic organization . . . and contemporary economics systems."¹ The courses were considered to be in the humanities area of a four-year curriculum of prescribed courses for all cadets.

When the Academy curriculum was implemented between 1955 and 1957, the two recommended courses were consolidated into one full-year course entitled "Economic Principles and Problems." Also, during the first two years of the Academy's operation it became apparent that many cadets were capable of, and interested in, working beyond minimum course requirements. As a result, a program of curriculum enrichment was initiated in 1957 which allowed

*By Captain Robert D. Beland and Captain John W. Schuman.

¹U. S. Department of Defense. The Air University, *Air Force Academy Planning Board Study, The Curriculum, Volume 2*, Air Force Academy Planning Board, Maxwell AFB, Alabama, 1949, pp. 101-107. Copy held in USAF Academy Library Special Collections, USAF Academy, Colorado.

cadets to validate or overload in their academic schedule and earn either a "Major in Missile Technology" (the engineering area) or a "Major in Public Affairs" (the social sciences area). The "Major in Public Affairs" required the "Economic Principles and Problems" course. The course became issues-oriented and provided the bedrock upon which the economics major was to be evolved.

With the advent of the two "majors" and the expanded role of economics courses, the tradition that service academies primarily granted engineering degrees was broken. From this point, the Air Force Academy developed an academic perspective in which the objective was "... to provide graduates with a background of general knowledge comparable to that possessed by graduates of good colleges and with an awareness of the problems of the nation which they are dedicated to serve."²

The Department of Economics had been one of the original (1955) academic subdivisions developed to administer the curriculum. When the department introduced the "Economic Principles and Problems" course in 1957, it embarked upon a long, stabilizing trend for supporting core curriculum requirements. This first course emphasized both macroeconomics and microeconomics within a framework outlined by national security problems . . . concepts that would be reemphasized over several decades. The "Principles and Problems" course was taken by all cadets during their second class year. The objectives were to:

- Arouse in each cadet a lasting interest in real-world economic problems.
- Provide the cadet with a fundamental tool kit for economic analysis.

²U. S., Department of Defense, Air Force Academy, *Self-Survey Report-1958*, North Central Association of Colleges and Schools, USAF Academy Library Special Collections, USAF Academy, Colorado, 1958, p. 92.

- Assist the cadet in developing an orderly, objective approach to economic problems of public policy.
- Afford the cadet an opportunity to practice the use of economic analysis as one major tool in reaching sound judgments on important public policy issues.
- Create an awareness among the cadets of economics' relationship to national security.³

By 1958, the department had developed four enrichment courses to supplement the core curriculum course. The titles of the courses reflect trends and emphases within the department which were closely attuned to trends in the external academic community.

- Current Economic Problems
- History of Economic Thought
- Introduction to Investments
- Comparative Economic Systems

This dramatic increase in the number of courses was accomplished with a department faculty of six. However, new manpower authorizations granted in 1958 engendered a rapid growth in departmental personnel. Growing pains were quickly realized and documented:

The Department of Economics became concerned that too many of its faculty were taking too many courses leading to degrees in business administration and management to the neglect of economics. One department member felt that the department was acquiring too many instructors from one institution—Harvard. "For example, out of the ten officers presently scheduled for FY 61, seven have

³U.S., Department of Defense, Air Force Academy, *History of the United States Air Force Academy, AY 1958-59*, Historical Division of the Academy Office of Information, USAF Academy Library Special Collections, USAF Academy, Colorado, 1961, p. 309.

business degrees and seven are graduates of Harvard University." The department was working on this problem at the end of this reporting period.⁴

However, these kinds of difficulties were soon overcome as both faculty and enrichment courses were expanded. The cadets' response to enrichment courses exceeded expectations. Thus, during academic year 1962-63, the number of enrichment courses was expanded from four to ten. Additional topics included "Economics of the Soviet Bloc," "Intermediate Theory-Microeconomics," "Intermediate Theory-Macroeconomics," "Economic Theory-Growth," "Economic Theory-Developing Areas," and "Investments." The "theory" courses were seminars to especially enrich those cadets who might choose to attend graduate school later in their Air Force careers.

Academic year 1963-64 served as an important milestone in the economics program. During this period the Dean announced a phasing out of the four-year prescribed course curriculum, replacing it with a "majors-for-all" program. The basic "Principles and Problems" course which had been taught during the second class year was now moved to a cadet's third class (sophomore) year to function as a required course for all cadets.⁵ And, the economics curriculum was again expanded along the line of that in 1962, this time to accommodate a joint international affairs/economics major. It was believed that neither discipline alone could support a separate major, so a joint program combined courses

⁴U.S., Department of Defense, Air Force Academy, *History of the United States Air Force Academy, AY 1957-58*, Historical Division of the Academy Office of Information, USAF Academy Library Special Collections, USAF Academy, Colorado, 1960, p. 205.

⁵William T. Woodyard, "A Historical Study of the Development of the Academic Curriculum of the United States Air Force Academy" (Ph.D. dissertation, University of Denver, 1965), p. 253.

from both disciplines with an option to concentrate course work in either political science or economics. The major proved popular; an average of about fifty cadets enrolled annually during the first few years of its existence. A cooperative graduate degree program with Georgetown University was also approved by the Air Force Institute of Technology (AFIT) during 1963. The program provided that as many as fifteen cadets each year could take graduate courses in economics at the Academy and, in just seven months, finish the requirements for a graduate degree in international affairs/economics in residence at Georgetown University. Cadets responded enthusiastically to this opportunity and twenty completed the graduate program during the initial year of operation (1964-65).

By 1967 the Department of Economics had expanded to a total of twenty-five faculty members teaching twenty-six separate courses. Indeed, the overall curriculum course expansion in economics had been so extensive during the 1960s, and the cadet response to those course offerings so great, that a separate economics major was established during 1967.⁶ Approximately 25-30 cadets began enrolling annually in the major. In addition, a cooperative masters degree program for economics majors was established with the University of California at Los Angeles in 1967.

As the department increased its staff of personnel, many members began to make valuable research contributions in support of the Air Force Academy; Headquarters, U.S. Air Force; and Department of Defense requests. Their research emphasized application of economic theory to solving problems of national defense. In 1968, the staff made a concerted effort to engage in defense spending and budgeting analysis

⁶U.S., Department of Defense, Air Force Academy, *Institutional Report for the Review Examination (Accreditation)*, 1968-69, North Central Association of Colleges and Secondary Schools, USAF Academy Library Special Collections, USAF Academy, Colorado, 1969, pp. 281-82.

as a continuous, long-term project. One objective was to use the data developed as a means of reinforcing classroom presentations with "real-world" problem solving. A summer research consultant program was established. Highly selected and motivated cadets were included in the research effort. Since 1968 the contributions of both faculty and cadets in this kind of research have been extensive. Topics examined and contributions made are too numerous to list. But it seems fair to state that the performance of Academy economists has added immensely to both the education of future officers and the prestige of the entire Academy faculty.

During the 1969-70 academic year, the management curriculum was integrated into the Department of Economics. The new organization became the Department of Economics and Management. This change culminated the evolution of "management" from a single course taught by the Division of Airmanship Studies to a multi-course "major" closely aligned with the quantitative analysis approach of economics.⁷

By 1970, thirty-four courses were offered in the department, and an average of about twenty-two cadets were graduating with an economics major while four to five cadets were entering the cooperative graduate program at UCLA each year.

In academic year 1971-72, the cooperative graduate program in economics was changed from UCLA to the University of Michigan and the University of Pittsburgh. However, in that same year, the Superintendent announced that *all* cooperative graduate degree programs at the Academy would be discontinued with the Class of 1975. In its place, a USAF

⁷U. S., Department of Defense, Air Force Academy, *Minutes, Faculty Council Meeting 27 March 1963*, Academy Faculty Council, USAF Academy Library Special Collections, Colorado, 1963; and *Minutes, Academy Board Meeting 22 April 1963*, Academy Board, USAF Academy Library Special Collections, Colorado, 1963.

Academy Honor Grad' the program would be installed to allow the top 15% of each class in the Graduation Order of Merit to attend an AFIT-approved graduate sponsorship program, but not earlier than three years following graduation from the Academy.

The department responded to this change by phasing out those graduate courses directly linked to the cooperative program (e.g., Advanced Seminar in Microeconomic Theory). Other than those course deletions, however, only minor adjustments in upper division course content were required.

Between 1973 and 1977 the economics program at the Academy remained relatively stable. Beginning with academic year 1976-77, the core economics course was reduced from two semesters to one and one-half semesters to accommodate the introduction of a half-semester core course in management.⁸ The reduction in core economics was primarily in macroeconomics, thus the one and one-half semester course emphasized microeconomics and national security problems. The number of upper division economics courses was also reduced in an Academy-wide curriculum revision during academic year 1976-77. But there were no extensive changes or discontinuity in the economics program.

In 1978, the economics major was revised to allow greater diversity of student emphasis within the discipline. Also, beginning with the academic year 1979-80, additional innovations are being incorporated in that regular courses in economic history and labor economics will be offered.⁹ These changes should provide instruction in vital subdis-

⁸U.S., Department of Defense, Air Force Academy, *Self-Study in Preparation for Evaluation, 1969-78*, Commission on Institutions of Higher Education of the North Central Association of Colleges and Secondary Schools, USAF Academy Library Special Collections, Colorado, 1978, p. 134.

⁹U.S., Department of Defense, Air Force Academy, *Annual Historical Report, 1978*, Department of Economics, Geography and Management, USAF Academy Library Special Collections, Colorado, 1978.

ciplines previously not available in the economics curriculum. Overall, the present course offerings provide a thorough preparation for Air Force assignments in analysis and other economics-related areas and also establish a solid foundation for graduate work.

Currently, fifteen advanced courses are offered, and during the past five years approximately 20-25 cadets have on the average taken a majority of these courses and graduated with the major each year. These graduates have established an outstanding reputation of service to the Air Force and the nation. Their performance reflects well on the economics program that has evolved over the past twenty-five years.

In the future, emphasis will continue to focus around the application of economic theory to problems of national defense. The continuation of a strong department-wide research effort contributes to that end as do our curriculum offerings.

Although the philosophical perspective of the principles of economics course, the core course, has remained relatively constant throughout the years, this should not be construed as evidence that economics at the "principles level" has succumbed to inertia. Most all offerings or versions of the core course have blended traditional theoretical concepts with contemporary problems. The most recent offerings of this course have especially focused on the use of economic tools to understand major economic issues of our time, e.g., income inequality, labor productivity, inflation, government budget deficits, monetary and fiscal policy, and the defense budget.

Of course, the perspective of any basic principles course flows from the textbook selected for the course. Throughout the years, our department has employed a variety of texts with differing approaches to the principles of economics, to include institutional, historical, or issues orientations. However, the department has inevitably returned to a rigorous, quantitative "main line" text (such as those authored by

Samuelson, McConnell, Reynolds, Peterson, or Lipsey and Steiner). These texts have been most successful because they are comprehensive and exhaustive in their treatment of topics. They also have high-quality supplemental materials which enable cadets to grasp elemental factors on their own when absent from class because of military-associated duties such as flying. We have also found that given the high-quality academic backgrounds of cadets, a more rigorous text holds their interest in the subject. Thus, given stabilization in textbooks, we are now spending more time in the realm of improving instructor quality in the core course.

Indeed, over the past several years, a great deal of effort has been expended in the recruitment and training of the academic instructors for all courses. This effort is to ensure that we have the best-qualified instructors who can yet offer an excellent role model as an officer for cadets. We believe that the combination of the two factors is necessary to provide positive reinforcement for cadets to become Air Force officers with useful abilities and attitudes.

Overall, our courses should continue to play an important role in the development of all cadets at the Academy. Our core course and follow-on upper division courses have greatly enriched our majors with techniques and concepts that are especially relevant for the Air Force officer. The Department of Defense is faced with smaller budgets and increased emphasis on the allocation of scarce resources. The tools acquired in economics courses at the Air Force Academy are specifically oriented to this kind of allocation problem. At a recent Corona Conference held at the Air Force Academy, Lt General Driesenach commented that we should ensure that all cadets receive the best education possible in economics because of its value in decision making in the Air Force. Our goal is to improve the integration of Defense Department-related problems into the structure of all courses. In turn, this integration should improve our ability to contribute to the cadet's future career.

Department of Economics, Geography, and Management

CHAPTER 16

MAINSTREAM OF GEOGRAPHIC EDUCATION AT THE USAF ACADEMY, 1955-1979*

Geography has been a requisite component in the education of cadets at the United States Air Force Academy since its inception. The earliest proposals for courses of study while the Academy was yet being planned included distinct traces of systematic, regional, and analytical geography. These concepts were subsequently formalized into a required course in the initial curriculum. The transition from a single-course offering to a multi-faceted geography majors program over the Academy's twenty-five year history is marked with many academic and administrative changes. While the Academy's curriculum was adjusting to institutional growth, the discipline of geography in the American academic community was also experiencing significant transformations. Both phenomena have had a profound impact on the evolution of the geography curriculum at the Academy. However, despite external influences, the essence of geographical inquiry remained focused on the professional development of future air officers.

During the formative years of curriculum evolution at the Academy, geography's perceived role was clearly to establish a foundation of general knowledge about the world. In 1949, the Air Force Academy Planning Board recognized that future graduates would operate in various alien environments throughout the world:

The specific operation of the Air Force . . . is concerned with particular countries as regions of the world. Knowl-

*By Lieutenant Colonel Earl F. Saunders.

edge of major differences among the different areas . . . is . . . essential to intelligent operation . . . the uneducated reaction to differences in customs and ways of living is prejudiced dislike and disapproval of people concerned.¹

The concerns of the curriculum planners were directed to developing a program that would produce a well-rounded generalist who could successfully function in any environment.

The curriculum for the Air Force Academy is designed to provide such a program of education as would enable every Air Force officer [graduate], regardless of his specialty, to represent the Air Force advantageously in any educated group at home or abroad, socially or officially.²

Geography was well suited to this task and also provided technical skills which would enable the cadet to evaluate the differences between places on the earth. The thrust of the first required course (1955) was designed to give a thorough analysis of the major world regions as a basis for evaluating the "power potential" of specific areas of the world.³ The course was required for all fourth classmen (freshmen). Course content was focused around traditional regional geography, but the "air age" had introduced a new spatial perspective of world powers. Alexander de Seversky in discussing the role of air power in modern warfare commented:

¹U.S., Department of Defense, The Air University, *Air Force Academy Planning Board Study, the Curriculum, Volume 2*, Air Force Academy Planning Board, Maxwell AFB, Alabama, 1949. Copy held in USAF Academy Library Special Collections, USAF Academy, Colorado, p. 92.

²*Ibid.*, p. v.

³U.S. Department of Defense, Air Force Academy, *History of the United States Air Force Academy, AY 1954-55, 1955-56*, Historical Division of the Academy Office of Information, USAF Academy Library Special Collections, USAF Academy, Colorado, 1957.

. . . the entire . . . globe in the time of war will fall into a new pattern. Defense and security plans influenced by the old geographical notions have become wholly unrealistic.⁴

Contemporary geographic thought was changing. New concepts and perspectives were introduced into the Academy's course to keep pace with the contemporary trends of the discipline. The specific objectives of the initial geography course were:

to gain an appreciation of the physical and cultural processes which shape the earth environment,

to gain an appreciation of the major area differences of the various parts of the world and the interrelationships between them,

to examine those geographical factors which add to or detract from a nation's powers,

to impart a knowledge and understanding of the importance of geography in the application of air power, especially with regard to strategic intelligence and air operations, and

to inculcate a way of thought by means of which geographical knowledge can be significantly related to subsequent courses and duties in the USAF Academy.⁵

Professor Henry M. Kendall, Chairman of Geography at the University of Miami, critically reviewed the course with respect to content and instructional technique prior to its

⁴ Alexander P. deSeversky, *Air Power: Key to Survival* (New York: Simon and Schuster, 1950), p. 307.

⁵ Historical Division of the Academy Office of Information, *History of the United States Air Force Academy, AY 1954-55, 1955-56*, p. 538.

implementation. His favorable comment adds testimony to the strength of the Academy's initial venture in geographic education:

I wish it were possible for me to find a significant weakness. Except for detailed differences in emphasis and for the special needs of the Air Force Academy, I can find no items to which I am opposed. I can only say that I am favorably impressed.⁶

The development of this exceptional introductory course tailored to the professional education of Academy cadets is credited to Colonel Josephus A. Bowman and Lt Col Robert Showater. These two members of the original Academy faculty devoted considerable effort to this task.

Initially, geography was a part of the Department of Human Relations, as was law, philosophy, and psychology. An independent Department of Geography was established during 1955 with Colonel Bowman as Head.⁷ Instruction in geographic technical skills was charged to the Department of Graphics. A required course entitled "Charts and Maps" was provided to familiarize cadets with all types of maps which they would later use in Air Force operations. The thrust of this course was the interpretation of map data for navigation uses.⁸

In 1956, geography was joined with military history to form the Department of Military History and Geography. The singular geography offering in the Academy curriculum continued to function as a survey course stressing physical features, cultural features, and regional characteristics of the world. Military history retained its own identity during this period. Two teachers were borrowed from the History Department to assist in an increased teaching load. Colonel

⁶Ibid., p. 540. ⁷Ibid. ⁸Ibid.

Bowman indicated that "... exchanging instructors in allied fields might be of considerable merit."⁹ The initial geography course proved so successful that Lt Col Robert T. Ramseur published an article in the *Journal of Geography* in 1956 describing its content and the instructional techniques used at the Academy. Little change occurred in the department during 1957 with the exception that Colonel Wilfred Smith replaced Colonel Bowman as Head of Military History and Geography.¹⁰

In 1958, military history was reinstated with the Department of History; graphics instruction was joined to the geography program, and a separate Department of Geography was again formed. The new Professor and Head was Colonel Wyley L. Baxter. A slight shift was apparent in the emphasis of the newly acquired charts and maps course. The course title was changed to "Elements of Cartography," and more attention was given to the interpretation of earth representations and measurement, rather than the mechanics of map reading.¹¹ The introductory geography course retained a world regional approach with an underlying national power theme. The stated objective was as follows:

... to enable the cadet to understand reasons for progress in some areas of the world and lack of progress in others and to enable the cadet to evaluate present and future influences of geography on air power and national security.¹²

⁹U.S., Department of Defense, Air Force Academy, *History of the United States Air Force Academy, AY 1956-57*, Historical Division of the Academy Office of Information, USAF Academy Library Special Collections, USAF Academy, Colorado, 1958, p. 210.

¹⁰U.S., Department of Defense, Air Force Academy, *History of the United States Air Force Academy, AY 1957-58*, Historical Division of the Academy Office of Information, USAF Academy Library Special Collections, USAF Academy, Colorado, 1959.

¹¹*Ibid.* ¹²*Ibid.*, p. 209.

An experiment with an enrichment program was also attempted during 1958. An advanced world regional course was offered to selected cadets who had demonstrated superior aptitudes for geography. The academic material was essentially the same as the introductory course taken by other cadets, but there was an additional independent research requirement. The first "upper-division" geography course was also added to the enrichment curriculum during the 1958-59 academic year. "Political Geography" was offered as an elective for qualifying cadets. This course provided geographic inquiry into the political structure of the earth and traditional theories of global power distribution. The 1958 self-study report for Academy accreditation endorsed the total geography program as a vital component in the institution's integrated educational program:

The whole sequence furnishes the student with necessary tools for understanding humanities and social science courses, and in addition fulfills a specific requirement for the flying training program.¹³

By June of 1959, when the Academy graduated its first class, many important changes had accrued in the curriculum. The establishment of a solid, viable geography program had been masterfully completed. Geography had attained "department" status with two required courses and one enrichment offering. Nonetheless, the immediate future would bring an even more profound impact on the structure of the geography program. The period from 1960 to 1966 might well be considered the "developing years" for the discipline. During these years, geography would cultivate

¹³U.S., Department of Defense, Air Force Academy, *Self-Survey Report - 1958*. North Central Association of Colleges and Secondary Schools, USAF Academy Library Special Collections, Colorado, 1958, pp. 89-90.

a series of topical and regional courses to form the nucleus of a geography majors program. The geography faculty would increase in both size and expertise, and the Academy's contribution to academia would transcend the confines of the institution.

The first major change was an administrative merger with economics in 1960. The new parent organization was the Department of Economics and Geography. The union was primarily an organizational adjustment, but each discipline continued to operate autonomously. Geography retained its position in the required curriculum with two courses, "World Geography" and "Elements of Cartography," and maintained an elective, "Political Geography." "Cartography" was scheduled during the May term of 1960 which required a major restructuring of the course content because of a compressed instruction period. In 1960, cartography essentially disappeared as a separate required course. The single-semester "World Geography" course was expanded into a two-semester "Elements of Geographical Science" offering. Cartography was integrated into this sequence along with systematic subjects. The additional contact time in the consolidated geography course provided more opportunity to examine natural and human processes in a global setting. One-half of the sequence concentrated on climate, vegetation, soils, and earth materials, while the second half was devoted to man-land relationships and the analysis of human problems.¹⁴ The topical and regional coverage of geography was more complete than in previous years.

A subsequent curriculum adjustment in 1960 compressed the two-semester offering in geography into a single, double-period, one-semester course. This was primarily in response

¹⁴U.S., Department of Defense, Air Force Academy, *History of the United States Air Force Academy, AY 1960-61*, Historical Division of the Academy Office of Information, USAF Academy Library Special Collections, USAF Academy, Colorado, 1962.

to the introduction of an expanded enrichment program Academy wide. This transitional period (1960-61) was marked by an experiment in which an entire class took geography in the same semester. The manning requirements could not be filled by the geography staff; consequently, it was necessary to use officers from "related" disciplines as adjunct instructors. The results were not completely satisfactory. The adjunct instructors did not have sufficient expertise to provide in-depth analyses. Workbooks were employed in laboratory exercises, and geography instructors provided background information in lectures, while adjunct teachers monitored and graded exercises. This organization inhibited the development of creative thought and analytical problem solving. Cadets were not provided with a good understanding of geographic principles.¹⁵

By the fall of 1962, the modification of the introductory geography course had been completed. Fortunately, only half of the fourth classmen were now enrolled per semester. The new, single-semester, four-hour course was reorganized in terms of scope and sequence. There were two equal parts: twenty-one lessons were devoted to systematic physical geography and twenty-one lessons to human-regional geography. Strahler's *Physical Geography* set the tone for the examination of natural processes.¹⁶ The human element was explored through Wheeler, Kostabade, and Thoman's *Regional Geography of the World*.¹⁷ A workbook and study guide were used to reinforce classroom discussion concepts. This structure permitted a satisfactory topical and regional examination of geography; missing, however, were the cartographic skills which had been introduced in earlier curricula.

¹⁵Ibid.

¹⁶U.S., Department of Defense, Air Force Academy, *Course Syllabus, Geography 123*, 1962, Department of Economics and Geography, USAF Academy Library Special Collections, Colorado, 1962.

¹⁷Ibid.

The double-period introductory course continued in the required curriculum until 1967.

Few additional changes of any consequence ensued during 1963 within the introductory course. Preston James' *One World Divided* became the predominant choice for the regional block of instruction.¹⁸

Several important milestones appeared in the 1964-65 time frame. Many additions were made to the advanced geography offerings. New courses added to the curriculum were "Physical Geography," "Economic Geography," "Geodesy," "Western Europe and the Mediterranean," and the "USSR and Eastern Europe." These reflected the trends and emphases within the department which were keenly attuned to the external academic community. Thus, at the Academy, geography during the early formative years (1955-59) was characteristically different from the later developing years (1960-66). The essence of geographic knowledge as an important element in professional development of future officers and Air Force operations had been explicit in the course organization during the formative years. In the subsequent years, this professional orientation of geography was implicitly present, but the focus turned to academic concerns and the propagation of geographic thought.

The year 1966 marked the beginning of what might well be termed the established years for geography at the Air Force Academy. Geography was again organized as an independent department; Colonel Robert G. Taylor was appointed as Permanent Professor and Head.¹⁹ A geography

¹⁸U.S., Department of Defense, Air Force Academy, *Course Syllabus, Geography 123, 1964*, Department of Economics and Geography, USAF Academy Library Special Collections, Colorado, 1964.

¹⁹U.S. Department of Defense, Air Force Academy, *History of the United States Air Force Academy, AY 1966-67*, Historical Division of the Academy Office of Information, USAF Academy Library Special Collections, USAF Academy, Colorado, 1968.

majors program was initiated during academic year 1967-68, which instantaneously began to attract 15-20 cadets a year. The majors program grew rapidly in both course offerings and cadet enrollments.

However, the four-semester-hour core course was reduced to a two-and-a-half-semester-hour course during academic year 1967-68. This reduction in contact time seriously curtailed the topical coverage once possible. It was no longer possible to examine at the previous level physical, cultural, and regional geographic concepts. It was therefore necessary to either eliminate or significantly reduce coverage of some topical material. The result was a course which concentrated on a man-land relationship theme and offered a cursory analysis of the natural environment. Hoyt's *Man and Earth* was used as the basic text.²⁰ The course objective was stated thus:

. . . to provide a broad overview of the physical, cultural, and organizational features of the world in order to develop an awareness and understanding of its people and their problems.²¹

That objective was a major reorientation from previous trends. The department, in assessing its progress over its first fifteen years of existence, indicated that there had been a gradual reorientation of the geography curriculum.

The basic geography curriculum has evolved toward a more appropriate alignment with the needs of the curriculum . . . designed as a cartographic tool course pri-

²⁰U.S., Department of Defense, Air Force Academy, *Course Syllabus, Geography 110, 1967*, Department of Geography, USAF Academy Library Special Collections, Colorado, 1967.

²¹Historical Division of the Academy Office of Information, *History of the United States Air Force Academy, AY 1966-67*, p. 338.

marily in support of navigation, the core curriculum has moved toward the development of an awareness of the physical earth and man's habitat. This . . . reorientation provides better support to social science/humanities offerings and satisfies . . . the needs for earth sciences in the curriculum.²²

As of 1967-68, the discipline reversed its previous trend toward physical geography and placed more emphasis on man. A self-study component which entailed programmed place identification was added to the newly reorganized introductory course. Cadets were provided with academic materials which were designed to be a self-paced, self-taught program in an effort to satisfy an apparent deficiency in their knowledge of locations. Graded homework and testing were used to reinforce learning. This instruction was subsequently replaced with a similar but more ambitious program in 1968 entitled "World Place Location," which prevailed through the spring of 1972.

Parallel developments were emerging in advanced courses in response to the increased demand of geography and area studies majors. A Far East course was added in 1968; "Cultural Geography," "Advanced Techniques," and "Independent Studies" were added in 1969. Geography 495, *Special Topics*, was offered for the first time in 1969; "Urban Geography" was the selected subject for the fall, and "Cartography" reappeared as a geography offering under the 495 format in the spring of 1970. In 1971, "Cartography" became an annual offering, while "Physical Geology" added a new dimension to the program as did a revised political geography course.

²²U.S., Department of Defense, Air Force Academy, *Institutional Report for the Review Examination (Accreditation)*, 1968-69, North Central Association of Colleges and Secondary Schools, USAF Academy Library Special Collections, Colorado, 1969, p. 63.

In 1970, Colonel Taylor was awarded the Legion of Merit for superior ability and professional skill in establishing the first modern, vital geography curriculum designed specifically to serve the needs of the Air Force.²³ Other members of the department were also recognized for significant contributions to the discipline through various research efforts and publications in major journals.

The 1970-73 time frame marks the zenith of geography at the USAF Academy. Additional topical courses were introduced including graduate-level offerings in support of a newly instituted cooperative program with the University of Oklahoma beginning with the class of 1973. An "honors element" was added to the core course for selected cadets. Upper-division courses were instructing 500-600 cadets per year, and the number of geography majors was increasing steadily (thirty majors per class on the average). The 1972-73 academic year ended with a well-established, prestigious, multifaceted geography program at the USAF Academy.

A period of abatement commenced in 1973. As a result of a realignment of the faculty, modification of the curriculum, and reduction in manpower, geography suffered some significant losses. Geography merged once again with economics (and now management) into the Department of Economics, Geography, and Management. Administratively, the merger created considerable adjustment problems; however, academic disturbances were minimal, and geography continued to function as an autonomous discipline.

The introductory core course continued to be predominantly focused on human geography. However, many experimental changes were introduced in an effort to find the

²³U.S., Department of Defense, Air Force Academy, *History of the United States Air Force Academy, AY 1970-71*, Director of Historical Studies, Academy Office of the Command Historian, USAF Academy Library Special Collections, USAF Academy, Colorado, 1972.

optimum blend of topical information. One experiment included locally produced instructional material in a modular form as a supplement to the textbook; this experiment was abandoned after one semester because of inherent weaknesses. The student workbook which for more than a decade had been a trademark in the basic geography course was also eliminated. The primary teaching structure was oriented toward specifically defined "performance objectives." This structure was more rigid than earlier concepts of "lesson goals." Unfortunately, the experimental period did not last long enough to evaluate adequately the overall effectiveness of this teaching technique.

Advanced courses in geography underwent a major restructuring in 1974. Due to directed course reductions and the deletion of the cooperative masters program, a revision of the total geography curriculum was necessary. Graduate-level courses were easily eliminated; however, the trimming of upper-division courses without destroying the balance and flexibility of the program was a formidable task. The rapid growth of the majors program in the 1968-74 period had engendered a curriculum with twenty upper-division courses; it had been a relatively easy task to satisfy a majors requirement and still appeal to a cadet's individual interest. A required reduction to fifteen courses threatened to undermine the strength of the majors program. The number of options open to cadets was also reduced from seventeen to eleven as a result of curriculum revisions. The solution for geography was to build a program on the four pillars of the discipline—physical, cultural, regional, and analytical—with a strong emphasis on application through research. The scientific trend in the American geographic community which began in the sixties was firmly embedded in the 1974 reorientation of the Academy geography program. Not only were new courses added and old courses deleted, but the emphases of individual courses were realigned to reflect the analytical thrust of contemporary geography. One new

course, "Geographic Application of Imagery Analysis," focused on application of remote sensing techniques to Air Force problems. Practical exercises were employed in other courses, such as the production of an energy map for the Federal Energy Agency by the students enrolled in the cartography course. Individual research efforts of cadets were promoted by the new orientation. In three successive years, geography majors captured the first three places in a student paper competition sponsored by the Regional Association of American Geographers. Faculty members similarly devoted significant efforts to individual research with great success.

In 1976, the geography core course was dropped from the curriculum of the USAF Academy. The loss of the core course was a serious blow to the viability of the discipline and threatened the breadth of cadet education.

The overall ramifications of this loss in terms of cadet education have not been completely noted . . . the future of geography at the Academy is contingent upon the development of a core course.²⁴

The overall impact could be anticipated in three general areas: (1) the diminution of geography majors, (2) the reduction of the geography staff, and (3) the degradation of the general education and professional development of all cadets. It is too soon to evaluate the effect of the lack of a core course for attracting cadets to the geography major. But, diminishing returns are especially noticeable in the class of '81; only 13 cadets have thus far (September 1979) enrolled in the major. It seems plausible to assume that

²⁴Colonel L. D. Badgett, Letter, "Self-Study Report for Accreditation, 6 June 1978," USAF Academy Historical Records, Special Collections, USAFA Library, USAF Academy, Colorado, Atch 2, p. 1.

minimal exposure to geographic thought will not generate sufficient interest in many cadets to seek advanced education in geography. Most cadets have had virtually no exposure to geography beyond elementary school. Without a required introductory geography course at the undergraduate level, it is unlikely that students can realistically evaluate the merits of the discipline as a field of study. Furthermore, there has been a significant reduction in the course enrollments in upper-division geography courses as the number of geography majors has decreased and the number of electives (options) available to cadets in other academic disciplines has declined. The decrease in course enrollments necessarily implies a decrease in the geography staff. The geography faculty has declined from a one-time high of twenty-five officers to the current strength of six. It is unlikely that such a small faculty can for long maintain the breadth of knowledge and expertise required of a balanced geography program. The discipline of geography is diverse; most learned geographers acquire expertise in only a small segment of the discipline. A reduced geography staff imposes a consequent dilution of geographic expertise on the entire faculty.

The most critical impact from the loss of the geography core course is that it deprives all cadets, regardless of specialty, of a vital component of their general education and preparation for a lifetime career in a globally responsive Air Force. The role of the USAF and the mission of the USAF Academy have not changed in substance over the past twenty-five years. The perspectives of the 1949 Academy Planning Board Study which emphasized the need for geography in the curriculum are relevant today and will be in the future.²⁵ Geography should be considered an essential element in the education of a military officer.

²⁵The Air University, *Air Force Academy Planning Board Study, The Curriculum, Volume 2.*

Geography is . . . an element of every military equation. The military commander who ignores geographical factors, or fails to evaluate them correctly, invites disaster on the battlefield.²⁶

Geography and military operations are inseparable. It is within this context that the future of geography at the USAF Academy is viewed with optimism. It is anticipated that, within a short time, serious considerations will be given to the reinstatement of a geography core course, required for all fourth classmen. The advanced track of geographic studies is yet well grounded in analytical techniques. The tools courses, in particular, have been specifically designed to meet Air Force applications. There appears to be no threat to the loss of quality in geographic education where particular expertise remains.

Finally, no assessment of geography at the Academy would be complete without mention of the important contributions of the many individuals who have played a part in its unfolding. The successes of geography at the Air Force Academy are very much attributed to the dedication and forethought of the many outstanding officers who have cycled through the department. Sincere gratitude and the highest commendations are their due.

²⁶Emil Ludwig, *Napoleon* (New York: Liveright, 1943), p. 407.

CHAPTER 17

EVOLUTION OF THE USAF ACADEMY MANAGEMENT DISCIPLINE*

Management as a field of study at the Academy has evolved from a course block of a few hours inserted in a general leadership program, to a sequence of courses that had difficulty finding a permanent home, to its present status as the largest major in the cadet wing. The changes resulting from this evolution have sometimes been cosmetic and at other times substantial. Nevertheless, for both cadets and the Air Force, the special importance of the management discipline has never been in doubt. The many changes that have occurred in the discipline at the Academy over the past 25 years were largely the result of institutional growing pains and the inevitable shifting of functions that occur in new organizations.

While the Academy was still being conceptualized, the Air Force Planning Board in 1949 tasked the future Academy Division of Military Studies to familiarize cadets with goals obtainable through efficient management. The art of management, its functions and basic principles, and the Air Force procedures with respect to application were to be presented to each cadet.¹

The sole exposure of the original Academy class to management training was through the military training portion of

*By Lieutenant Colonel James R. Anderson.

¹U.S., Department of Defense, *The Air University, Air Force Academy Planning Board Study, The Curriculum, Volume 2*, Air Force Academy Planning Board, Maxwell AFB, Alabama, 1949, pp. 261-2. Copy held in USAF Academy Library Special Collections, USAF Academy, Colorado.

the Airmanship curriculum. Instruction was given under the title "Leadership Training." During the 1957-58 academic year, the Department of Military Studies was developed to equip cadets with the management and leadership skills essential to preparing potential junior officers for the problems they would encounter. Among those items on the curriculum was Air Force management and military leadership. The Management Division of the department provided forty-eight hours of instruction in the principles and practices of Air Force executive functions.²

By the time the first Academy class entered active duty (1959), cadet leadership indoctrination was centered around the study of psychology and management. This training was given by the Division of Airmanship Studies. Among the available courses were "Personnel Management" and "Air Force Advanced Management," both 2½-credit-hour courses.³ The courses were taught by the Commandant of Cadets, but their credit hours were carried under the totals for the Division of Social Sciences which helped balance the curriculum between science and social science/humanities subjects.

Part of the charter of the Department of Leadership Studies was to introduce cadets to the principles of leadership in terms of a focus on the study of both psychology and management. The department petitioned for a name change, explaining it was not the only Academy agency teaching leadership but that, in fact, the entire Academy presented leadership studies. The name change requested—although not approved—was the Department of Psychology and Management.⁴

²U.S., Department of Defense, Air Force Academy, *The Department of Military Studies: USAF Academy*, Staff Study, Colonel H. L. Hogan, USAF Academy Library Special Collections, Colorado, 1957.

³U.S., Department of Defense, U.S. Air Force Academy *Catalog 1959-60* (Washington, D.C.: Government Printing Office, 1959).

⁴Colonel G. Wolke, Letter, "Request for Department Name Change, 31 July 1959," USAF Academy Historical Records, Special Collections, USAFA Library, USAF Academy, Colorado.

Within the first year of the department's operation, the director requested a curriculum revision for the management courses. The director felt that management instruction during the third-class year was not desirable. Cadets, he thought, should be taught "followership" during those initial years at the Academy, while latter years at the Academy could be used to strengthen leadership (management) skills and their applications. Accordingly, the initial management course was moved to the spring of the second-class year.⁵ (Interestingly enough, some eighteen years later when management was to become a core course, it would be offered in the third-class year.)

Cadets continued to gain experience in human relations and leadership problems through programs operated under the Commandant of Cadets during academic year 1961-62. However, a significant change in both the philosophy of management training and the framework within which it would be presented occurred during the 1962-63 academic year. The Department of Leadership Studies was transferred to the Dean of the Faculty under the name of the Department of Psychology. Basic elements of Air Force management continued to be taught by the Commandant of Cadets, but broader aspects of the field and enrichment courses were now under the auspices of the Dean of the Faculty. Among those courses taught by the Department of Psychology were "Human Relations in Management" and "Advanced Problems in Psychology." The human relations course instructed cadets in the basic principles of management and the significant aspects of human behavior within organizations. In the psychology course, Air Force personnel management problems in terms of personnel selection and evaluation issues were examined.

⁵Director of CLS (Logistics), USAF Academy, Letters, "Implications of Course Revision on Operation Third Lieutenant, 13 and 18 August 1959." USAF Academy Historical Records, Special Collections, USAFA Library, USAF Academy, Colorado.

"Human Relations in Management" was considered an essential course for cadets in order for them to realize maximum benefits from Operation Third Lieutenant. Those cadets that had not received the course were given a six-contact-hour management course by the Department of Psychology. Both courses were designed to enable cadets to "Gain an understanding of the principles and practices of Air Force management."⁶

During the 1962-63 academic year, the Department of Psychology was reorganized. It was redesignated as the Department of Behavioral Sciences. The purpose was to account for the wider variety of subject matter provided in course offerings than the prior name had suggested, and much more emphasis was placed on management. The department began to present subjects dealing with an understanding of human resources and their effective utilization.⁷ Cadets were to be prepared for progression into eventual command and staff positions. A major in military management was offered which required 18½ to 20½ semester hours of enrichment courses beyond the prescribed core curriculum.

Several courses comprised solely of management concepts were offered. Behavioral Science 282, *Elements of Management*, served as an introduction to the field with emphasis on the fundamental managerial functions of planning, organizing, directing, coordinating, and controlling. The course was designed to better prepare cadets to assume responsibilities as officers and managers in the active-duty Air Force. Behavioral Science 302, *Human Relations in Management*, was

⁶U.S., Department of Defense, Air Force Academy, *Year End Report of Activities, 1961-62*, Department of Psychology, USAF Academy Library Special Collections, Colorado, 1962.

⁷Director of DFBSC (Behavioral Sciences), Letters, "Department of Behavioral Sciences—Future Instructor Potential, 26 September and 19 November 1962," USAF Academy Historical Records, Special Collections, USAFA Library, USAF Academy, Colorado.

focused on group dynamics and included a 12-hour block on managerial functions.⁸ Additionally, enrichment courses in such areas as "Industrial Management" and "Labor Management Relations" were designed especially for the Air Force officer.⁹

Overall, the military management major developed in 1962-63 was "designed to provide the cadet with a facility for handling management problems of the type that he would face early in his career and to provide a basis for further development as a military manager-leader through both practical experience and further education."¹⁰ Speaking before the Armed Forces Management Association, the Chairman of Behavioral Sciences stated that:

We maintain that in whatever occupational specialty an Air Force officer may obtain a particular proficiency, he will always be primarily an administrator, a leader, or a manager. This is really the definition for the term "officer" in any large organization.¹¹

The major was constructed around a core of management courses with military orientation and related areas in economics, history, psychology, and government contracting. Management was offered in the core curriculum in terms of "behavioral sciences" courses. Fifty-nine members of the classes of 1963 and 64 were enrolled in the military manage-

⁸U.S., Department of Defense, Air Force Academy, *Year End Report of Activities, 1962-63*, Department of Behavioral Sciences, USAF Academy Library Special Collections (Document D-15), Colorado, 1963.

⁹*Ibid.*

¹⁰U.S., Department of Defense, Air Force Academy, *Military Management Major, 1962-63*, Report, Department of Behavioral Sciences, USAF Academy Library Special Collections (Document CUR-11), Colorado, 1962.

¹¹Director of DFBSC (Behavioral Sciences), Speech, "A New Major's Program at the Air Force Academy," delivered before the Armed Forces Management Association in 1962, USAF Academy Historical Records, Special Collections, USAFA Library, USAF Academy, Colorado.

ment major, seven of whom attended either Stanford or Purdue University for graduate management training.

By 1964-65, further changes in the management curriculum were in the offing. In 1964, the Department of Economics and Geography registered disagreement with the Department of Behavioral Sciences concerning the structure of the management major. Unable to resolve their differences, both departments submitted proposals to the Dean of the Faculty for consideration and determination of the direction that the management program should take. After considering both proposals, the Dean directed the Department of Economics to prepare a program for the management major.

The proposed program consisted of nine courses. The Department of Behavioral Sciences would be responsible for courses in "Personnel and Industrial Psychology" and "Social Psychology." The Law Department would teach government contracting, and the Economics Department would furnish courses in managerial accounting, two courses in quantitative methods in defense analysis, two courses in economic analysis, and a seminar in defense analysis. The Faculty Council retitled the program "Major in Management." The Academy Board unanimously accepted the new concept; and beginning with the Class of 1965, the new major was available under the auspices of behavioral sciences.¹²

In August 1965, the Department of Behavioral Sciences was redesignated as the Department of Psychology and Leadership. The objectives and missions of the department were changed. All department courses began to emphasize man in the working environment and focused on psychological tools useful to USAF officers. The understanding of

¹²U.S., Department of Defense, Air Force Academy, *Minutes, Faculty Council Meeting, 27 March 1963*, Academy Faculty Council, USAF Academy Library Special Collections, Colorado, 1963; and *Minutes, Academy Board Meeting, 22 April 1963*, Academy Board, USAF Academy Library Special Collections, Colorado, 1963.

human behavior became the foundations of the leadership courses taught in the department.¹³ This basis provided reasonable support for the management major. Cadets interested in the field majored in what was entitled "Engineering Management." The decision-making process was especially emphasized. By this time, a cooperative arrangement initiated in 1963 with the University of California at Los Angeles (UCLA) allowed selected cadets to begin earning credit in a graduate-level management program at the Academy. Those cadets selected proceeded directly to UCLA after graduation and completed requirements for the award of a degree of Master's of Business Administration. Fifteen cadets of the class of 1967 were engaged in this graduate program.

During the 1968-69 academic year, the Department of Psychology and Leadership adopted a scientific and quantitative approach to various courses with emphasis on the use of the scientific method. A concentrated effort was made to improve the quality of leadership instruction to all cadets, and extensive revisions were made in several courses. That shift may have occurred in part as a reaction to a report of the North Central Association of Colleges and Secondary Schools which reflected the need to monitor constantly the details of Academy programs that were designed in the absence of new learning and managerial techniques.¹⁴ Economics during this same period noted that the prescribed and elective courses offered within management emphasized the use of quantitative techniques.

The Cooperative Graduate Program in Management continued to attract large numbers of cadets. The classes of 1969

¹³U.S., Department of Defense, Air Force Academy, *Year End Report of Activities, 1965-66*, Department of Psychology and Leadership, USAF Academy Library Special Collections, Colorado, 1966.

¹⁴U.S., Department of Defense, Air Force Academy, *Institutional Report for the Review Examination (Accreditation), 1968-69*, North Central Association of Colleges and Secondary Schools, USAF Academy Library Special Collections, Colorado, 1969, p. 6.

and 70 both had 20 cadets entering UCLA. Nonetheless, the management discipline would begin undergoing a substantial reorganization during the 1969-70 academic year. "Management" was combined with the Department of Economics, and both disciplines began to jointly administer the major in engineering management as well as the cooperative graduate program with UCLA. The new parent organization was entitled the Department of Economics and Management. The engineering management major continued to be extremely attractive to large numbers of cadets. Ninety-one majors graduated in the Class of 1971, and twenty-one attended the UCLA graduate program. During that academic year (70-71), the Academy catalog for the first time listed courses with management designations.¹⁵

The engineering management major was redesignated as the "management major" during academic year 1971-72 to reflect the broadening scope of the program. This redesignation was in part an acknowledgement that required courses formerly taught by the Psychology and Leadership Department were being transferred into the Department of Economics and Management as the former department was dissolved. The major continued to be very successful in that 108 cadets graduated with it in 1971-72, and sixteen entered the cooperative graduate program with UCLA. However, the cooperative program was deleted for all majors after 1975, bringing revisions in the management curriculum to again orient it to the management undergraduate major. The management major continued to attract a substantial percentage of the cadet wing after 1975, and various tracks such as Human Resource Management, Management of Financial Resources, Quantitative Management

¹⁵U.S., Department of Defense, Air Force Academy, *Year End Report of Activities, 1970-71*, Department of Economics and Management, USAF Academy Library Special Collections, Colorado, 1971; and US Air Force Academy *Catalog 1970-71* (Washington, D.C.: Government Printing Office, 1970).

Tools, Management Environment, and Management Skills were offered within the major to enhance the popularity and usefulness of the program.¹⁶ In turn, major Air Force commands increasingly complimented our well-trained graduates.

In academic year 1976-77, a significant milestone for the management discipline occurred. "Introduction to Management," a one-half course unit, was added to the core curriculum for the Class of 1979 and subsequent classes. It provided an introduction to the principles and techniques of management with major emphasis upon planning, organizing, and controlling.¹⁷ For the first time, a core management program of twenty-one lessons was offered to all third class cadets.¹⁸

During the academic year 1977-78, some of the more substantive changes of the recent past were made in the management curriculum. The major was restructured to provide cadets more flexibility by offering management and non-management options through "suggested areas of emphasis" built around management techniques applicable within the cadet wing as well as the Air Force. A multi-disciplined approach reflecting the current state of management education was also employed.

Some of the recent changes in the management course offerings and the structure of the major reflect continuing adjustments to the Academy curriculum. Other changes have been and are being made to keep the major attuned to the dynamic environment of management education. The present

¹⁶U.S., Department of Defense, Air Force Academy, *Dean of Faculty Year End Report of Activities 1971-72, Section VI*, USAF Academy Library Special Collections, Colorado, 1972.

¹⁷U.S., Department of Defense, US Air Force Academy *Catalog 1976-77* (Washington, D.C.: Government Printing Office, 1976).

¹⁸U.S., Department of Defense, Air Force Academy, *Annual Historical Report, 1977*, Department of Economics, Geography and Management, USAF Academy Library Special Collections, Colorado, 1977.

study program far surpasses general requirements for an undergraduate program prescribed by the American Assembly of Collegiate Schools of Business, but further assessment as an on-going process continues.

The present major can be made even more flexible and adaptive to the needs of both the individual cadet and the Air Force. We are striving for a balance between quantitative orientation and theoretical application. Such skills as human resources management and financial analysis are contained in management options and will continue to give the program depth.

The program is not without concerns. In addition to the challenges of maintaining a high-quality set of offerings, it is difficult to offer an optimal mix of courses due to the institutional constraints that limit the number of course offerings. Also, a half-semester core course is insufficient to meet the needs of today's cadet.

Accordingly, the Deputy for Management Instruction intends to propose a full-semester Introduction to Management course within the next three years. Curriculum reviews will continue annually to ensure that course offerings reflect current management research and understanding and are at the same time theoretically sound. Extensive research efforts dealing with management practices and defense spending have long typified faculty endeavors and will continue to be encouraged. We also plan for our instructors to take a more active role in the American Assembly of Collegiate Schools of Business Activities, and we expect to obtain the first Distinguished Visiting Professor in Management for the Academy faculty in academic year 1980-81.¹⁹

¹⁹Colonel L. D. Badgett, Letter, "Self-Study Report for Accreditation, 6 June 1978," USAF Academy Historical Records, Special Collections, USAFA Library, USAF Academy, Colorado.

CHAPTER 18

PERSPECTIVES ON THE NEW OPERATIONS RESEARCH FIELD OF STUDY AT THE ACADEMY*

Operations research is an entirely new field of study instituted at the Air Force Academy in 1977. Operations research in one form or another has been used by our armed forces continuously since World War II, but its rapid growth in recent years was stimulated by Secretary of Defense MacNamara in the early 1960's. At the present time, there are systems analysts on the Air Staff, at major air command headquarters, and throughout the Air Force. The adoption of the operations research (OR) major by the Air Force Academy is an attempt to provide skilled people for the systems analysis field (AFSC 268X).

The first class to participate fully in the OR major was the Class of 1979. The major offered is comprised of elements of both the social and quantitative sciences and is oriented toward solving real-world problems. The field of study is interdisciplinary, drawing its courses from the management, economics, mathematics, and computer science areas. Details about the courses and their emphases are found in the reports of the Economics, Geography, and Management Department (pp. 193-228), the Mathematics Department (pp. 23-37), and the Astronautics and Computer Science Department (pp. 63-76). Table 18-1 shows the course offerings included in the OR major. These courses were selected to provide the students with the broad background necessary to function in an area which is heavily dependent upon both quantitative and non-

*By Lieutenant Colonel William J. Weida.

TABLE 18-1. Operations Research Major

The major in operations research is designed to provide the cadet with the academic background necessary for duty as an Air Force scientific analyst as well as for graduate studies in Operations Research and Systems Analysis. This interdisciplinary program will appeal to the student who enjoys problem solving and quantitative decision making and who wishes to prepare himself to analyze the complex issues in operations, plans, research, and system development so prevalent in today's Air Force.

Basic Requirements:	Course Title and Descriptive Information
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1979 and subsequent

A. 37 course units of core courses

B. 11 course units of majors courses as follows:

1. Comp Sci 362	Computer Simulation
2. Econ 465	Introduction to Econometrics
3. Math 358 or	Statistics
Mgt 331	Statistical Decision Methods
4. Math 360	Linear Algebra

The following 3 courses:

5. Math 371	Introduction to Operations Research
6. Math 441	Linear Programming
7. Math 442	Decision Theory and Game Theory

or the following 3 courses:

- | | |
|------------|--------------------------------|
| 5. Mgt 460 | Management Science |
| 6. Mgt 462 | Advanced Management
Science |
| 7. Mgt 360 | Decision Analysis |

and

- | | |
|----------------------------|---|
| 8. Math 457 or
Math 341 | Probabilistic Models in OR
Introductory Numerical
Analysis |
| 9. Mgt 485 or
Mgt 472 | Systems Acquisition and
Management
Defense Managerial
Applications |
| 10. OR Option | |
| 11. Open Option | |
-

quantitative theory. Direction of the major is rotated annually between the Mathematics Department and the Economics, Geography and Management Department to assure that this balance is properly maintained. The field of study is extremely strong academically because of the intense mathematical preparation of the cadet.

The major has been strengthened considerably over the past year in that approximately forty members of the Class of 1981 have selected it. The popularity of this sub-discipline is enhanced by a very active summer research program. The major should eventually represent 5-7% of each cadet class.

We believe that it is necessary to continually assess the curriculum and objectives of this interdisciplinary field with respect to changing techniques in management and the dynamic requirements of defense analysis programs within the Air Force. Both faculty and cadets involved in the field of study here at the Academy have been solving current

defense community problems dealing with budgeting and outlays. In turn, major commands have been especially interested in our major and its potential for providing future officer inputs.

Instructor exposure to new developments in the field is being assured through research, symposia, and professional reading. That exposure is complemented by a steady acquisition of new instructors who are recent graduates of major operations research schools throughout the nation. Their inputs are used to update both the curriculum and emphases of the major. The computer facilities at the Academy are also constantly being upgraded to insure that the potential for handling new techniques is in being. The Mathematics and the Economics, Geography and Management Departments meet annually to discuss proposed revisions and additions to the overall program. Continuing emphasis will be placed on exposure to "real-world" problem solving.

CHAPTER 19

TWENTY-FIVE YEARS OF TEACHING LAW TO UNDERGRADUATES*

Academic instruction in American universities about law and the legal system has been conducted for the most part by the law schools. Very few undergraduate schools have offered any law courses, at least until an upwelling of interest in law as a topic for undergraduate study at a number of civilian universities in the past fifteen years. At the service academies, on the other hand, the study of law has been well established since it became part of the curriculum at the United States Military Academy in 1816. At the United States Air Force Academy the curriculum since 1958 has contained at least two law courses and a varying number of enrichment courses. The scheduling of the core law courses and the topics covered in each course have changed from time to time over the past twenty-five years, but the essential role and nature of the law offerings at USAFA has remained remarkably stable.

The Core Courses

Graduates from the Air Force Academy immediately become government officials as officers in the United States Air Force. Many of them become supervisors and commanders very quickly, and all have special responsibilities for other personnel and government property because of their status. Military officers have much more frequent contact with public laws and the legal system than do most other

*By Major Phillip A. Johnson.

citizens because Acts of Congress, executive orders, regulations and court decisions form both the basis for an officer's authority and also a set of constraints that limits how that authority may be exercised.

It is apparent that a military officer needs to have a working knowledge of the legal principles that bear most directly on his or her authority and responsibility. The provision of that basic legal knowledge is one of the purposes for including law in the core curriculum. The USAFA core law courses may thus be viewed in part as pre-professional in nature (for the military profession, not the legal profession), much like the teaching of business law in a business school, or copyright law in a college of journalism.

A second equally important purpose for the law courses is the study of law as part of a liberal education. The legal system performs essential functions in American society, some of which are the peaceful and fair settlement of disputes among citizens, the control of anti-social behavior, the protection of constitutional liberties, the facilitation of private transactions, and a mechanism for orderly social change. The study of the functions played in society by the judicial process in its many forms is useful in producing an informed citizen in the same manner as is the study of history, economics, or of other government institutions.

Much of the value of a liberal education lies in the exposure of the student to different methodologies, or different ways of thinking about things. The legal system has generated a pattern of thought usually referred to as "legal reasoning," which is a conscious attempt in decision-making to give due weight to precedent, fairness between the parties to a dispute, and the probable effects of alternative decisions on other persons and on society in general. Exposure to this pattern of thinking, which is displayed best in the written opinions of courts deciding specific controversies before them, can materially contribute to the intellectual development of the student.

Another unique aspect of the study of law, at least among the social sciences, is its concentration on decision-making. Much of social science is concerned with trends, tendencies, countervailing forces, and probabilities. It is the inherent nature of the judicial process that every case before the court has to be decided, not merely studied. Experience in marshaling considerations on both sides of an issue is common to many disciplines, but the student is often not pushed to a final choice of a concrete solution as he is in a law course.

It is impossible to study law, even as a liberal arts subject, without exposure to some substantive rules in the areas used as examples. Some of the substantive law to which the student is exposed may be useful in his or her intended profession, as mentioned above. Exposure to other rules and doctrines may be useful in managing the student's own personal affairs. Some basic knowledge of the law of contracts, torts, property, insurance, taxes and similar subjects would fall into this category. A few schools teach courses in law with this latter purpose as the highest priority. These courses are often referred to as courses in "personal law," or "street law."

The core law courses at the Air Force Academy are designed to serve all three of these major purposes: contribution to liberal education, acquaintance with legal principles important to military officers, and exposure to some rules and doctrines helpful in managing the student's own personal affairs. The priority among these purposes is in the order listed, although any particular reading assignment or class discussion may serve all three purposes to a greater or lesser degree.

In the first year that a core law course was taught at the Academy (1957-1958), only one core course—Law 301, *An Introduction to Law*—was offered. It was a 3-semester hour, 50-lesson course covering a block of material called "Elementary Law," (primarily contracts, torts, and property), together with materials on criminal evidence and the legal

rules concerning military forces stationed abroad, particularly under the NATO Status of Forces Agreement.

In 1958-1959, the core law offering was expanded to two courses, which has been the basic pattern from that time until the present. During the experiment with winter terms from 1968 to 1970, the second core law course was divided and taught during successive winter terms, but the scheduling change did not greatly affect the content of the total core course instruction. There was a period from 1970 to 1977 when the first core course was only two-thirds of a semester, the other third of the semester being occupied, for scheduling convenience, by an introductory philosophy course. With these exceptions, there have been two full-semester core courses in law. They have been taught at various times in the students' schedules, normally in the Second and First Class Years. At present the first core law course (Law 300, *An Introduction to Law*) is normally scheduled for either semester during the Second Class Year; and the second course (Law 400, *Law for Commanders*) is taken either semester of the First Class Year.

There have been significant changes in the content of both core law courses, but the general pattern has remained remarkably consistent. The first course has always focused on the study of the legal system as a liberal arts subject, and the second course has covered subjects of special professional interest to military officers. No attempt will be made here to relate all the changes in the content of the courses over the years, because the current organization of the two courses reflects very well the philosophy and methodology of the core law curriculum from the beginning.

Law 300, *An Introduction to Law*, begins with a discussion of the roles that legal systems play in every society, and examples are given from various primitive and advanced societies to show that various forms and procedures serve the same basic purposes. The history of the English legal system is explored in some detail, since it formed the founda-

tion of the American legal system both procedurally and substantively. The structure of the Federal and state court system is reviewed, and the division of power between the state and federal governments is discussed. With this background, three substantive areas of law are surveyed—property, contracts and torts. A number of substantive rules are studied, less for their inherent value than for what they reveal about the workings of the system and the process of legal reasoning. As an incidental benefit, the student should become acquainted with a number of legal doctrines of practical utility in planning his or her personal affairs. The last third of the course is devoted to a study of personal liberties guaranteed by the United States Constitution, and in particular how they are enforced and interpreted by the courts. The role of the courts in applying constitutional protections such as due process, equal protection of the laws, and freedom of speech is seen to be quite different from their role in the resolution of private disputes among citizens.

Law 400, *Law for Commanders*, is focused more on the substantive rules relevant to the duties of military officers than on the legal system as a social institution, but the distinction is one of emphasis only—the course is taught as an academic subject, not as a military training exercise. The first half of the course is devoted to the study of criminal law, criminal evidence, and the military justice system. Next, a number of subjects of special military interest are briefly covered, such as the legal status of U.S. forces abroad, federal labor-management policies, equal opportunity programs, government record-keeping laws, the authority of an installation commander over persons and property on the base, military board of officer actions, and other similar topics. Five lessons are devoted to the international Law of War and its implementation by U.S. forces. Finally, ten lessons are devoted to personal estate planning, including subjects such as credit, insurance, investments, and wills and estates. This last block of instruction is provided pri-

marily for the use of the students in their personal affairs.

The Law Department has regularly searched for commercially-published textbooks for use in both the core courses, thus far without success. Law school textbooks are much too detailed and difficult, since a law school program may spend a whole year of study on a subject such as Contracts that we briefly survey in nine lessons. There are a number of commercial textbooks for business law courses to be taught at the undergraduate level, but the purposes of these courses and the topics they cover are quite different from the USAFA core law courses, and the textbooks are unsuited for use in our courses. There are a dozen or so commercial textbooks prepared for use in liberal arts law courses, but for one reason or another all of these have proven to be unsuitable as well. Some of them are designed as "shaft-sinking" courses, where the class spends a whole semester studying varying aspects of a narrow legal subject (examples are the development of liability for defective products, the treatment of compensation for on-the-job injuries, and the law of criminal conspiracy). For reasons of educational policy, we have elected not to design our core courses in this way. Most of the remaining texts are designed for a one-semester introductory course, but they devote half or more of the text to criminal law, which we have chosen to defer for study in the second course. The criminal justice system has a great deal of intrinsic interest for students, but it is in many ways atypical of the rest of the legal system. Most students would do better to study civil (non-criminal) law in some depth before they study the vagaries of criminal justice.

As a result, the Law Department has always prepared its own textbooks for both core law courses. This requires significant extra effort, and local printing is an extra expense, but it has also produced the important advantages of flexibility in making changes when desired and the capacity to update the text more frequently than is usually the case with

commercially published textbooks. Department members will continue to review new textbooks as they become available, but it seems unlikely that one suitable for student use in either core course will be found.

In addition to the textbooks for each course, the Law Department provides each cadet with a course notebook. The notebook contains information about the course, a glossary of legal terms, and for each class session an outline of the lesson for the day and a set of discussion questions. A discussion question usually contains a brief fact situation that requires the student to apply some concept from the assigned reading in order to arrive at an answer. The instructor may choose to plan class sessions around the discussion questions, but there is no requirement that they be covered in class in any standard manner. It is obvious that students are not likely to use the discussion questions to prepare for class if they are seldom covered in class, but each instructor has discretion to conduct classes in whatever manner the instructor considers most effective. New notebooks are prepared for each semester to discourage reliance on squadron archives as a substitution for original effort in class preparation.

The most effective testing method in a law course is the essay question. Legal concepts are usually expressed verbally, rather than numerically, and a test of recall and explanation is clearly more accurate than a test of recognition or selection among printed answers. The typical Law Department essay is a short factual situation containing one or more legal issues. The student is asked to recall and state the rule or concept that applies, and then to explain its application to the stated facts. The majority of points on graded reviews are allocated to two or three essay questions. In order to increase the number of different topics that can be touched upon in a 50-minute testing period, several multiple-choice questions are usually also included in each graded review. On the final examination there may be a higher proportion of multiple-choice questions in order to achieve coverage of all

parts of the course in the time available. Testing policy in the core law courses has remained relatively stable over the years, and no significant changes are contemplated in the near future.

The Enrichment Courses

The two main purposes of the enrichment courses taught by the Law Department are the pursuit of liberal education and contribution to various academic majors. A course in constitutional law has been offered one semester each academic year since 1957-1958. The study of the development of various constitutional doctrines such as the separation of powers, due process, and equal protection of the laws is of obvious value to a student of American government or American history—so much so that most undergraduate political science departments offer courses entitled “Constitutional Law.” Such courses are usually taught by an instructor trained in political science, rather than in the law, which results in a quite different approach to the course than when the subject is taught by a lawyer. Law 451, *Constitutional Law*, is currently taught in the fall semester; enrollment is approximately 40-50 students each year.

A course in international law has been offered each year since 1959-1960. Its relationship to the international affairs major is obvious, but the enrollment of 50-60 students each year includes students from many different academic majors. The course explores the basic rules of behavior considered to be obligatory on nations, and their sources and application, with particular emphasis on the portions of international law that relate directly to military and airspace activities.

A course in government procurement law has been offered each year since 1963-1964. The legal principles applying to government procurement actions are in many important ways quite different from the law of private contracts. There are many policy reasons for the special legal treatment of govern-

ment contracts, some of which reflect an effort to reduce inefficiency and error, while others promote equal access by contractors or pursue unrelated social policies such as the encouragement of small business enterprises and promotion of minority-owned businesses and minority employment. Law 462, *Government Procurement Law*, was a quite large course when it was required for all management majors from 1963 to 1978. Since it was made an optional majors course in 1977, enrollment has declined to approximately twenty-five students per year.

A special topics course, Law 495, has been offered each semester since 1969-1970. The course is limited to one section of fourteen students and is taught by three instructors who are all present for each class session. The course focuses on legal problems currently under public debate, such as civil disobedience, capital punishment, abortion, euthanasia, victimless crime, welfare reform, school busing and other similar topics. The students are exposed to considerable information about these topics, but the principal purpose of the course is to review the variety of different tools that the legal system can bring to bear in helping to solve a social problem. A corollary is the discovery of situations where the legal system does not seem to be well suited to deal with particular problems. Each student prepares a course project consisting of a federal or state statute designed to solve some current social problem and defends the proposal orally for a class period before the course instructors. Most students enrolled in Law 495 have been interested to one degree or another in the practice of law as a career, but there have been a significant number of students with no aspiration to be lawyers who took the course simply because it promised to be interesting.

Three of the enrichment courses are taught out of standard law school textbooks. In all of the enrichment courses the case-study method is used to a much greater extent than in the core courses. Progress through the material is of course

slower than in law school, but the students have always done quite well with the course materials as long as unfamiliar terminology and procedures are explained to them when necessary. Law 462, *Government Procurement Law*, is currently using a textbook and casebook prepared by HQ AFLC for use in a course on the subject for Air Force Contracting Officers. The only other available texts on the subject are designed for use in a Master of Laws program, a post-graduate course for students who have already completed law school.

Students who have taken one or more of the enrichment courses have generally responded quite favorably on course critiques. They typically report that the law enrichment courses are somewhat more difficult than other courses being taken in the same semester, and that they require somewhat more time for preparation, but that they are more interesting than other courses taken the same semester. The students have consistently evaluated their future usefulness very highly. We are generally well satisfied with the structure of the enrichment courses as they are currently constituted. Our only cause for concern is a decline in enrollment due to the major revision in the curriculum that occurred a few years ago. The reduction in available schedule openings for majors options and open options has had a noticeable effect in diminished enrollment in all of the law enrichment courses.

The Department

The members of the Law Department have always been selected from active duty Air Force judge advocates. The traditional USAFA policy in favor of a military faculty is especially appropriate for the law department. It is unlikely that any prospective instructor other than one with experience as an Air Force judge advocate would be familiar with Air Force policies and procedures on the military law subjects taught in Law 400, or be able to relate the more general legal topics in other law courses to their applications in active

duty Air Force situations. On another level, the law department is teaching future commanders what they can expect of judge advocates. If a commander knows when to seek legal advice and what resources a judge advocate will be able to contribute to the problem at hand, he or she may be able to avoid difficulties before they occur. The value of exposing cadets to judge advocates has clearly been recognized by The Judge Advocate Generals (TJAGs) over the years. By statute, TJAG makes all judge advocate assignments. The incumbent TJAGs have always given the USAFA Law Department first priority in the assignment of top quality young judge advocates.

The Law Department has grown from seven members in 1957-1958 to eighteen members in 1978-1979. Most of this expansion is due to the increase in the size of the Cadet Wing, together with the fact that each graduate must complete the two core law courses. The vast majority of the time of department members continues to be devoted to the core courses.

In addition to teaching duties and the other cadet and Academy activities in which all faculty members typically engage (such as squadron faculty officer, academic advisor, officer representative, and associate air officer commanding), Law Department members have some special responsibilities of a legal nature. In accordance with AFR 110-22, a legal assistance program is conducted on a walk-in basis for cadets, faculty members, and faculty dependents, as well as for other Academy personnel who happen to appear at the Law Department rather than at the Staff Judge Advocate's office in Harmon Hall. Through the legal assistance program advice is given on personal legal matters, and documents such as wills and contracts are prepared.

Legal advice on official matters is given to other academic departments, the Dean of the Faculty, and to other Academy agencies. Most legal advice to the command is provided by the Staff Judge Advocate, but we are frequently consulted on

questions peculiar to the faculty, such as copyright issues or the acceptance of scholarships and grants, and on miscellaneous other matters.

Law Department members play a major role in the Cadet Honor System and in cadet disenrollment proceedings. A member of the department acts as Legal Advisor to the Cadet Honor Committee, and another member provides advice to every cadet who is found by a cadet jury to have violated the Cadet Honor Code. Department members serve as Legal Advisors to all Commandant's Boards and boards of officers convened under AFRs 11-31 and 53-3 to consider cadet disenrollment cases. Department members also serve as Respondent's Counsel and Recorders on disenrollment boards. The time consumed by participation as counsel or legal advisor varies considerably between officers and over time, but it represents a considerable workload in the typical semester.

Members of the department have developed special expertise in several areas that have led to their utilization in Air Force wide programs. Recently, the two areas receiving special attention have been the Law of War and Personal Estate Planning. DFL members have been called upon in recent years to assist in Air Force-wide programs on both subjects by making presentations at other installations and by assisting in the preparation of publications and training aids.

Members of the department are rarely assigned to full-time research activities, but many officers have written scholarly articles for publication during their faculty tour of duty. Two or three such articles are published in a typical year, ranging over all sorts of legal subjects. These articles have appeared in the Air Force Judge Advocate General's *Law Review* and in a variety of civilian publications.

Officers in the department regularly participate in Continuing Legal Education courses offered by TJAG and by civilian law schools and bar associations; and most DFL officers complete one or more professional military educa-

tion courses by correspondence or by seminar while stationed at the Academy.

The typical department member arrives at the Academy as a Captain with three to five years service as a judge advocate. All are law school graduates who have been admitted to the bar of one or more states. A few have Master of Laws degrees in specialized subjects such as international law or government procurement law. Most department members are promoted to the grade of Major while at the Academy. The majority of officers completing their faculty tour have been reassigned as base Staff Judge Advocates, with the remainder going to a variety of specialized or headquarters assignments. A tour of duty at the Academy is regarded as a definite asset to the career of a judge advocate, and we have had no difficulty in attracting large numbers of highly qualified applicants.

Graduates

No law major has ever been offered at the Air Force Academy, and none is contemplated. The Law Department has administered the social science major since it was created along with the other divisional majors in 1976, but the social science major does not concentrate on law courses any more than on other social science courses. There is also no prescribed pre-law program, principally because most law schools express the opinion that no single program of undergraduate education is "the best" preparation for law school. Most legal information acquired in college courses will have to be relearned in greater detail and from a different perspective in law school. The principal assets a law student ought to acquire in an undergraduate school are a broad liberal education; skill at reading, writing and speaking; and logical reasoning ability. All of these can be acquired as well in a science or engineering major as in the humanities or social sciences, as long as there is a broad core curriculum such as that at the Air Force Academy.

A small number of cadets in each class express an interest in going to law school at some future time. They are encouraged and assisted to take the Law School Admission Test, since there is considerable data tending to show that most students score highest on the LSAT during their senior year of college. Students interested in law school are advised that taking USAFA enrichment law courses will produce no particular benefit in getting into a law school. The only probable benefits beyond their intrinsic educational value will be an increased familiarity with the student on the part of members of the law faculty, perhaps resulting in more useful letters of recommendation, and exposure to classwork that more closely resembles the law school experience than does that in the core courses. The student may or may not find the case-study Socratic dialogue to be something that he or she wishes to engage in for the three years of law school.

From 1963 to 1974, up to one percent of each graduating class, or approximately eight graduates each year, could be selected for immediate entry into law school under the Excess Leave Program. Since 1974, graduates wishing to enter law school have been subject to the general rule for virtually all graduate education programs that the officer must complete two years of active Air Force service after graduation from the Academy before entry into graduate or professional school. Also since 1974, USAFA graduates are eligible to compete for the statutorily-authorized Funded Legal Education Program, under which up to twenty-five Air Force officers a year can enter law school at government expense and while drawing normal pay and allowances.

Either under one of the two Air Force legal education programs, or on their own, more than three hundred USAFA graduates have completed or are enrolled in law school. Some of these officers have left the Air Force, but a sizeable number are now serving as judge advocates. Four USAFA graduates are now serving as members of the Law Department, and two others were formerly members of the department.

It is not a major purpose of the Law Department to produce future lawyers. The purpose of all the courses taught by the Department is to educate future officers for the whole broad range of duties performed by Academy graduates. The fact that USAFA graduates have become an important source of Air Force judge advocates is, however, a pleasant incidental benefit of the whole Academy educational process.

Department of Behavioral Sciences and Leadership

CHAPTER 20

**LEARNING ABOUT LIVING AND LEADING:
BEHAVIORAL SCIENCES AT THE U. S. AIR FORCE
ACADEMY***

The Department of Behavioral Sciences and Leadership views its responsibility to cadets and to the institution in a broad way: to develop responsible individuals in the fullest sense of the word. As an academic department its responsibility is to teach cadets, but more, to teach cadets those things which really will make a difference in their lives and in their professional careers. From the Department's standpoint, this fundamentally involves imparting knowledge about how and why people act, think, and feel the way they do.

The Department's role is beyond a purely academic one, beyond even that of demonstrating and reinforcing military professionalism, which is the shared responsibility of all of the academic departments. The Department has the responsibility of formally representing the academic discipline concerned with those very issues which are most central to cadet development: individual and group behavior, motivation, training, and leadership.

This centrality is indicated in various recommendations to the Academy by study groups whose charters were to identify necessary qualities of the ideal Air Force Academy graduate. For example, in 1948 the Air Force Academy Planning Group listed skill in human relations as one such

*By Major Richard L. Hughes.

quality.¹ In another study, in 1978, Air Force general officers noted that since the major concerns of senior officers are people problems, the curriculum should reflect that importance.²

An Identity Problem

Behavioral science is central to the Academy's mission. However, the centrality of the *discipline* to the whole Academy enterprise has posed some problems for the *Department*. Among other distinctions, the Department of Behavioral Sciences and Leadership probably has had more different titles than any other agency or department at the Academy. It has been known as the Department of Psychology, the Department of Psychology and Leadership, the Department of Behavioral Sciences, and the Department of Life and Behavioral Sciences, as well as by its current name. These changes reflect a problem that is deeper than simple dissatisfaction with a name. They indicate that specifying the Department's role in the mission of the Academy has been more problematical than that for other academic departments. This problem arises because of the unique constitution of the federal military Academies, with a Dean of the Faculty who is responsible for cadet academic development and a Commandant of Cadets who is responsible for cadet military development. With such a make-up, where does the teaching of leadership appropriately fall—to the Dean or to the Commandant? In many ways, of course, it falls to both. But does that imply each should have its own behavioral science department? That would seem to be an unnecessary

¹Cited in *Curriculum Pertinence Study*, U.S. Air Force Academy, 1 June 1978, p. 13.

²*Ibid.*

duplication of personnel and effort. Hence, the source of an "identity problem."

This problem is exemplified in the Department's early history, when each discipline at the Academy was struggling with defining its "critical" curriculum. From the very beginning, the core curriculum included a full academic year of psychology (originally scheduled for the thirdclass year). Similarly, that offering was composed of one semester of general psychology and one semester of applied psychology.³ The latter (1956-1958) course included such topics as management, leadership and group dynamics.⁴ In March 1958, an Ad Hoc Committee of the Academy Board proposed a Psychology and Leadership course. The Commandant supported this concept but proposed that it should be offered as an Airmanship course, since the stated mission of military training at the Academy was "to develop in the cadet the personal qualities and professional understanding necessary for leadership in the Air Force."⁵

As a result, the Department of Psychology was deactivated in May 1958, and the Commandant assumed responsibility for instruction in behavioral science. It should be noted that neither course content nor staff significantly changed. The change was primarily organizational. Thus, the required behavioral science courses, though designated as airmanship courses, covered such traditional topics as heredity, perception, personality, and learning, as well as applied topics such as leadership.⁶ Then, in 1961, the Superintendent re-

³Edgar A. Holt, et al, *History of the United States Air Force Academy*, 13 June 1956 - 9 June 1957, 1 November 1978, p. 216.

⁴Report of Ad Hoc Committee on Psychology-Leadership Course, 18 March 1958, in Edgar A. Holt, et al, *History of the United States Air Force Academy*, 10 June 1957 - 11 June 1958, Document D-69, 1 February 1960.

⁵Edgar A. Holt, et al, *History of the United States Air Force Academy*, 10 June 1957 - 11 June 1958, 1 February 1960, p. 193.

⁶Edgar A. Holt, et al, *History of the United States Air Force Academy*, 10 June 1958 - 30 June 1959, 1 February 1961, p. 409.

established the Department of Psychology under the Dean of the Faculty and these courses became "academic" again. These changes reflected an early concern with which agency should teach behavioral science, as well as with which one represented the best perspective and advice with regard to practical issues such as how to train, motivate, and counsel cadets.⁷

Despite such concerns, the Department's primary responsibility always has been instructional (rather than advisory). Therefore, we shall turn to a closer examination of the behavioral science curriculum, after which we shall examine the Department's development as a scientific and advisory resource to the Academy and the Air Force.

The Curriculum

The Leadership Courses

The core curriculum for cadets always has included one semester of applied behavioral science which is directed to the practical needs of Air Force officers. Although this was often described as a leadership course, the actual course content only gradually came to focus on the academic study of leadership. Thus, for awhile, early use of the title "Leadership" was somewhat cosmetic and imprecise. On the other hand, it provided a directing concept over the years for the evolution of the course based on changing analyses of course objectives. The course represents an evolving view of what behavioral concepts and principles are most relevant to the military leader.

In the early years, this view was somewhat managerial in orientation; the course title (starting in 1961) was "Human Relations in Management" and the three texts were manage-

⁷Interview of the Command Historian with Lieutenant Colonel G. D. Ofiesh, in M. H. Cannon, et al, *History of the United States Air Force Academy*, 1 July 1960 - 30 June 1961, 30 September 1962, Document COC-12, p. 3.

ment texts.⁸ In addition, other departmental offerings were developed to supplement and expand this orientation and in 1962-1963 the department offered a military manager major to cadets. Over the succeeding years, courses in motivation, personnel management, command leadership problems, industrial psychology, and organizational theory were developed. The core leadership course evolved from a primarily managerial one to one reflecting the breadth of behavioral problems facing the leader. This is reflected in the changed title (1965-1966), "Human Relations and Leadership."⁹ In 1969 the course took on a significantly more socio-psychological perspective, including major blocks on the theory of leadership, small group dynamics, organizational behavior, and social psychology.¹⁰ Subsequent course changes reflected increasing emphasis upon the application of behavioral science principles in the military. Thus, since 1961, this core course has been the primary academic course on leadership at the Air Force Academy.

Major curriculum changes were instituted throughout the Academy during the 1976-1977 academic year which affected leadership instruction. The semester-long leadership course was replaced by two half-semester courses, one to be taken during the thirdclass year and one to be taken during the secondclass year.¹¹ In many ways these courses represented a natural division in the content of the "parent course" which had been developing over a number of years. Even before the division, the course had become, con-

⁸Department of Psychology, "Yearly Activity Report," in M. H. Cannon, et al, *History of the United States Air Force Academy, 1 July 1961 - 30 June 1962, 30 June 1963*, p. 1.

⁹Psychology 302 Annual Report, in M. H. Cannon, et al, *History of the United States Air Force Academy, 1 July 1965 - 30 June 1966, 30 June 1967*, p. 2.

¹⁰M. H. Cannon, et al, *History of the United States Air Force Academy, 1969 - 1970*, Document DF-36, p. 4.

¹¹Department of Behavioral Sciences and Leadership Annual Activity Report, January 1977 - December 1977, p. 7.

ceptually at least, two different courses. Approximately half of it had emphasized the role of the leader in small group situations, including instruction on methods of behavior change, psychological aspects of discipline and obedience, and the critical analysis of current leadership models. Also, approximately half of the parent course had come to focus on the role of the military leader in individual interactions, particularly counseling situations. This latter emphasis grew from a recognition that all cadets required formal training in the theory and practice of counseling techniques. The division into two distinct courses, then, was a relatively natural one. The two courses became Behavioral Sciences 220 and 330, *Behavioral Science Applications to Leadership, Phases I and II*.

The relatively recent emphasis upon counseling as a necessary skill for the cadet and junior officer partly came about following a survey among Air Force Academy graduates who had majored in behavioral science. Two consistent themes (among others) which ran throughout their replies was their inadequate mastery of counseling skills and the pervasive need for those skills.¹² One of the Department's first responses to that problem was the development of an upper-division course in counseling theory and technique (Behavioral Science 490) which became required for certain behavioral science majors and which was open to all interested cadets. It was, in a sense, a "trial balloon" for the concepts and techniques which later would be incorporated in the core counseling course, Behavioral Science 330. Behavioral Science 330 has the distinction of being one of the few collegiate counseling courses in the nation which is directed specifically to undergraduates (at the Air Force Academy it is required for *all* cadets).

¹²Although no record of this survey was located, several faculty members of the Department at that time attested to these findings.

General Psychology

The other core behavioral science course is Behavioral Science 110, a freshman-level, semester-long course in introductory psychology. Thus, with the present arrangement, most cadets take a behavioral science course during each of their first three academic years at the Academy. Behavioral Science 110 develops cadets' appreciation of the complexity and variety of human behavior with special focus on the interrelation of biological, psychological, social, and cultural influences. Additionally, the course aims to enhance open-mindedness about human behavior and to assist cadets in making effective personal and social adjustments in their lives, with the expectation that this would contribute to their effectiveness as officers.¹³

The Academic Major

As early as academic year 1962-1963, the Department offered an academic major (The Military Manager). Since then the major has diversified and attracted increasing cadet interest. For several years the department has offered a number of specialized behavioral science programs for cadets wishing to major in the behavioral sciences. One of the most important factors in this diversification was a dramatic shift in emphasis in the Department beginning around 1969 toward the more scientific and experimental aspects of behavioral science. That shift was reflected in course offerings and objectives, the development of an exceptional psychological laboratory for educational and research purposes, and hiring practices.

The best point of time at which to note the inception of this trend was in 1969, under the chairmanship of Colonel Joseph Madden.¹⁴ However, this trend drew its life, if not its

¹³"*Cadet Course Guide for Behavioral Science 110*," Fall and Spring 1978 - 1979, pp. 3-4.

¹⁴Department of Psychology and Leadership, "Yearly Activity Report 1968 - 1969," p. 2.

birth, from the continuing presence over a number of years of four individuals in particular: Lieutenant Colonels L. R. Chason, Dirk Prather, Eugene Galluscio, and Lawrence Sharp. These four were themselves exceptional experimental psychologists, and the fortunate coincidence of their relatively lengthy and parallel tours in the Department provided opportunity for the continuing direction and development of the experimental emphasis in the behavioral sciences. Of all the trends during the first twenty-five years, this increasingly scientific and research-oriented philosophy is certainly one of the most important.¹⁵

For the cadet, this trend was most apparent in the behavioral science course work. Courses became more quantitative and laboratory-oriented. It was a period of increasing academic depth and rigor in the upper division behavioral science courses. By 1971, the Department offered a major's track in experimental psychology which was designed to prepare the cadet for graduate training in psychology. As well, the Department offered a track in psychological operations for the cadet who wished to apply behavioral sciences more directly to Air Force activities, and a track in clinical psychology for the cadet who wished eventually to specialize in the clinical/counseling areas.¹⁶ While these latter two tracks were relatively short-lived and did not always attract wide cadet interest, they indicated the Department's desire to offer cadets the opportunity to pursue formalized programs of special interest in the behavioral sciences. That philosophy has remained constant and the three track system has developed into the present curriculum, which allows specialization in individual behavior, organizational behavior, or

¹⁵As an index of the increase in scientific activity, consider the actual number of scientific publications or presentations at the different times. There were six in the whole Department in 1963-1964; there were fifty-three in 1973-1974.

¹⁶Department of Life and Behavioral Sciences, "Yearly Activity Report 1971-1972," p. 9.

human factors engineering.¹⁷ (The human factors track was a response both to cadets' proclivity toward engineering-type disciplines as well as the Air Force need for engineers who appreciate the human factor in design problems. It was approved in 1975.¹⁸)

For a period in the early 1970's, graduate-level behavioral science courses were offered in the Department as part of the Academy's cooperative Master's program (in this case with Purdue University), but this program was discontinued faculty-wide during the academic year 1974-1975. Only a few behavioral science majors were able to earn their Master's degrees this way.

Research

The Psychological Laboratory

As noted earlier, a significant trend over the past decade has been the Department's increasing emphasis on and interest in research. This emphasis has been reflected in an increasingly research-oriented bent in virtually all advanced courses as well as in the research activities of Department members.

The opportunity for laboratory research and demonstration was made possible by the development of a Psychological Laboratory in 1969. The laboratory, which now houses over \$300,000 worth of equipment, was a product of the desire for laboratory experiences for cadets in several courses, as well as of the staff's need for a basic research facility.

One of the outstanding features of the laboratory has been its accessibility to cadets. There are ongoing research programs which cadets have become involved in; or, with supervision, cadets can design their own studies with the sizeable

¹⁷*Curriculum Handbook*, 1978 - 1979, USAF Academy, pp. 50-51.

¹⁸Department of Behavioral Sciences and Leadership, "Special Semiannual Activity Report July 1975 - December 1975," p. 1.

array of psychological equipment and instrumentation which is available. The laboratory includes three flight simulators used in aviation psychology research, a biofeedback center, a learning module with programmable stations for the operant training of laboratory animals, special facilities for studying the effects of noise, various perceptual-motor equipment, and such other devices as videotape units, pupillometers, multi-channel tachistoscopes, and eye-tracking monitors. It is one of the finest psychological laboratories at an undergraduate school in the United States.

Institutional Research

One way to classify the Department's research activities is in terms of institutional research versus other-agency research. An increasing amount of effort over the last decade has gone into research accomplished for agencies at the Academy. The present heavy and productive involvement of the Department is particularly notable in light of an earlier history of relative noninvolvement with Academy problems. It is fair to say that the Department is now an active, involved, and respected participant in the totality of the Academy mission. It provides consultation and research services on behavioral issues to the Commandant, the Dean and the Superintendent, as well as to other subordinate agencies at the Academy such as the Officers' Club and the Hospital.

The breadth and depth of this involvement can be appreciated by considering some of the institutional research projects which the Department has recently conducted. Note that the following areas refer to full research programs and not to individual studies. One long term project involved assessment of entering and graduating cadets' personality characteristics in terms of the Minnesota Multiphasic Personality Inventory (MMPI). The purpose of this program was to develop a personality-based predictive formula of attrition

at the Academy. As a result, the Department possesses one of the largest MMPI data files in the nation.¹⁹

Another project grew from the decision to integrate female cadets into the Academy. As soon as the decision to integrate was made, the Department consulted with other appropriate agencies—virtually all that have contact with cadets—in order to make the integration of females a success. It was obvious from the outset that a unique social experiment was about to take place and it quickly became apparent that the integration of females should be carefully evaluated and documented. The Department “brainstormed” potential studies ranging from physiological studies of stress in female cadets to sociopsychological studies of group affiliation.

It was the Department's fortune at this very time to receive its first Distinguished Visiting Professor, Dr. Lois DeFleur of Washington State University. Dr. DeFleur, a nationally eminent sociologist, provided theoretical direction and guidance to these studies in female integration: female cadets' adjustment to the Academy and the Academy's adjustment to female cadets.²⁰

Other institutional research has included study of motivational and unmotivational aspects of the fourthclass system; cadet attitudes toward various features of USAFA's academic program, and the effectiveness of the summer Survival-Evasion-Resistance-and-Escape (SERE) Training program.

Other-Agency Research

Some Departmental research has been conducted on a contract basis for other agencies, including the Frank J. Seiler Research Laboratory, the Aerospace Medical Research

¹⁹See L. R. Chason and L. F. Sharp, “Psychological Factors Associated with Early Attrition from the USAF Academy,” *Journal of the Colorado-Wyoming Academy of Science*, April 1977.

²⁰See D. C. Gillman, “Sex-integration of the U. S. Air Force Academy: Changing Roles for Women,” *Armed Forces and Society*, 4(4), 1978, 607-622.

Laboratories, the Environmental Protection Agency, the Air Force Office of Scientific Research, and the Defense Intelligence Agency. A significant part of this research has been in the human factors and aviation psychology areas. There have been investigations of the transfer of learning from simulators to T-41 aircraft²¹; the validation of ground-based screening techniques for pilot training; and visual processing parameters in the use of helmet-mounted displays and peripheral cuing techniques for pilots.²² Another ongoing research contract has provided current evaluations of the state of Soviet research in psychology.²³ And yet another has sought to develop techniques of effective stress management, including biofeedback.²⁴ The practical focus of this program has been to help cadets who experience severe examination or test anxiety.

Consequently, the Department has directed its research effort chiefly toward applied rather than theoretical issues. One program which has had perhaps the greatest impact in this regard has been the job enrichment/organizational development work conducted by Lieutenant Colonel William Rosenbach of this Department.²⁵ Lieutenant Colonel Rosenbach has personally (along with Lieutenant Colonel Dennis Umstot) developed and directed the entire Air Force effort in job enrichment. Lieutenant Colonel Rosenbach and his team have visited numerous organizations on different Air

²¹See J. M. Koonce, "Predictive Validity of Flight Simulators as a Function of Simulator Motion," *Human Factors* (in press).

²²See M. F. Godfrey, B. A. Smith, and J. C. H. Schwank, "Visual Processing: The Effects of Peripheral Heading Cues in Flight," *Proceedings of the Psychology in the DoD Symposium*, USAF Academy, 1978, pp. 47-48.

²³See V. Tirman, *Soviet Psychology*, DoD Technical Report, 15 December 1977.

²⁴See R. L. Hughes, "A Comparison of Three Treatments for Test Anxiety," *Proceedings of the Psychology in the DoD Symposium*, USAF Academy, 1978, pp. 239-240.

²⁵See W. Rosenbach, "Participative Work Redesign and the Moderating Effect of Growth Need Strength: A Field Experiment," *Journal of Applied Psychology* (in press).

Force bases to "diagnose" the state of the unit and make recommendations to the commander. The success of this work in affecting such variables as morale and efficiency has been so outstanding as to merit the personal compliments of no less an observer than the former Chief of Staff of the Air Force and now Chairman of the Joint Chiefs of Staff, General David Jones.

Psychology in the DoD Symposium

For the last decade, the Department has contributed to behavioral science research by providing a forum for the exchange of research findings. This contribution has been through the departmentally-sponsored "Psychology in the DoD Symposium." The Symposium is a biennial meeting of DoD behavioral scientists for the purpose of exchanging findings and viewpoints. When it began in 1969, the Symposium was limited to Air Force research and attracted just several dozen participants. However, it has grown in size, quality, and respectability, and the last Symposium attracted several hundred participants and featured a keynote address by (then) president of the American Psychological Association, Dr. Theodore Blau. The Symposium attracts a diverse group of military and civilian scientists and professionals whose interests run the gamut of behavioral science in the DoD.

In addition to providing a forum for the exchange of research findings, the Symposium also provides a vehicle for the comparison of different approaches to similar problems across the armed forces. For example, panel discussions at previous Symposia have dealt with such issues as the role of women in the military,²⁶ organizational development

²⁶*Symposium Proceedings, Fifth Psychology in the DoD Symposium, 1976, p. xiii.*

consultation,²⁷ and occupationalism versus institutionalism in the armed forces.²⁸

Contributions to the Academy

Increasingly over the last ten years, the Department has served in an advisory capacity to other Academy agencies on behavioral science matters. While some have viewed that as an important responsibility of the Department from the first years of the Academy, the Department only became very active in that role around 1970. Furthermore, while this increased advisory activity paralleled increasing research activity, the two should be distinguished. Most of the advisory work was based on an application of psychological principles and the psychological point of view to Academy problems, especially issues of cadet development.

For example, one persistent problem has been the difficulty of many cadets in adjusting to the Academy because they were unaware of what the Academy would be like. Although various informational sources (e.g., liaison officers, high school counselors) existed to make candidates maximally aware of what to expect, numerous individuals arrived with very naive ideas about cadet training. In particular, many candidates did not have realistic expectations about how demanding and rigorous the fourthclass year would be. Literature for candidates often highlighted the glamorous aspects of cadet life but did not convey the amount of pure hard-work that being a cadet involves. Some of the basic cadets adjusted poorly to the Academy because of these early misconceptions. In order to instill more appropriate expectations, the Department cooperated in the development of a pamphlet entitled "Commitment to Excellence" which

²⁷*Symposium Proceedings, Fifth Psychology in the DoD Symposium, 1976, p. xiii.*

²⁸*Proceedings, Sixth Psychology in the DoD Symposium, 1978, p. 7.*

painted a more realistic picture of the Academy's demanding program.²⁹

Another way the Department affected cadet life was through its advocacy of a new training style for Basic Cadet Training called "positive motivation." This did not refer so much to the relative use of rewards versus punishments in training (although that is a part of it) as it did to one's point of view toward the function of the basic cadet's summer training. Previously, basic cadets were assumed to be positively motivated toward the Air Force Academy, the Air Force, and an Air Force career. Given that assumption, the role of training was perceived to be a test of that commitment: Make the training harsh to determine who really desires to succeed. It gradually became clearer, however, that the assumption was wrong; most basic cadets were relatively neutral toward the Academy, the Air Force and a military career. Given this neutrality, the role of training became to motivate the basic cadets toward such objectives and ideals. That change resulted in positive motivation.³⁰

In many other ways, too, the Department has instituted or revised programs to enhance cadet development. The How-to-Study Program is a major study-skills counseling effort which is directed by the Department and which involves over a hundred faculty counselors. It has been remarkably successful in boosting academic proficiency.³¹ Sexual Assault and Rape Training (SART) was an educational program

²⁹Department of Life and Behavioral Sciences, "Yearly Activity Report 1974-1975," p. 1.

³⁰Department of Behavioral Sciences and Leadership, "Annual Activity Report for 1976" notes that the Department was named Office of Primary Responsibility for Motivational Aspects of Basic Cadet Training. In a personal interview, Lt Colonel Eugene Galluscio, former Director of Research in DFBL, interpreted the nature of the positive motivation approach.

³¹The How-to-Study program was initiated by Lt Colonel Dirk Prather.

developed to provide for special needs of female cadets.³² Training in Personal Skills (TIPS) is a regular three week summer option of experiential group learning to help a limited number of cadets improve their interpersonal skills.³³

Military Psychology Award

In 1977 the Department was officially honored for its contributions to military psychology by the Division of Military Psychology of the American Psychological Association. The award was based on the quality and breadth of activity as outlined in the foregoing review. Fittingly, the award citation states that it is the behavioral science curriculum at the Academy "that ultimately constitutes the Department's most significant contributions to military psychology"³⁴

Cadet Counseling Center

The Cadet Counseling Center was transferred from the Registrar to the Dean of the Faculty in 1978. This marked a return full-circle, for when the Counseling Center was established in 1957 (then designated Cadet Counseling Services) it was assigned to the Dean of the Faculty. This reassignment to the faculty is perhaps most significant in that the Counseling Center is now a subordinate organization to the Department of Behavioral Sciences and Leadership. For the first time in the history of the Air Force Academy, the two major groups of behavioral scientists now belong to the same agency and can more effectively coordinate their efforts.

³²Department of Behavioral Sciences and Leadership, "Annual Activity Report January 1977 - December 1977," p. 4.

³³Department of Behavioral Sciences and Leadership, "Annual Activity Report January 1976 - December 1976," p. 23.

³⁴A. J. Drucker, E. I. Jones, and P. D. Nelson, Citation accompanying APA Division of Military Psychology 1977 award.

The Establishment of the Center

Virtually all colleges and universities have counseling services available to students, so it was natural and appropriate for the Academy to develop its own. One of the major contributors in the development of the Cadet Counseling Center was Lieutenant Colonel Gabriel D. Ofiesh, who was appointed Director of Academic Counseling at the Air Force Academy in 1957. His direction and planning set the stage for the future development of the Counseling Center.

From the first, the Center's responsibilities have been multi-faceted. The Center always has been responsible for counseling cadets in the areas of personal, social, academic, and military adjustment. Two of the Center's first specific responsibilities included counseling for the improvement of academic skills and conferences with cadets regarding military effectiveness ratings.

Interestingly, we can see in the Center's early years the same sort of "identity problem" which characterized the Department itself. The Center was assigned to the Dean of the Faculty, but part of its responsibilities included conferences on personal aspects of military effectiveness ratings. Perhaps for that reason the Center was assigned to the Commandant of Cadets under the Deputy of the Cadet Wing in 1959. Yet, another of the Center's responsibilities was academic counseling, and it may have seemed inappropriate for such counseling to be offered under the auspices of the Commandant. So, in 1961, Cadet Counseling was assigned to the Registrar. It was believed that greater flexibility and closer coordination with both the Dean and the Commandant could be obtained if the Center were assigned to a neutral area.³⁵ The Center remained there until being reassigned to the Dean of the Faculty in 1978.

³⁵M. H. Cannon, et al, *History of the United States Air Force Academy*, 1 Jul 1961 - 30 June 1962, p. 39.

The Mission of the Center

In analyzing the activities of the Center it becomes apparent that its mission is to assist cadets in their personal, academic, and professional development. For example, the following specific programs are a few of those offered through the Center in 1978: (1) Encounter groups for cadets designed to develop greater personal autonomy, self-awareness, and sensitivity to others; (2) desensitization programs for the reduction of test anxiety; and (3) individual and group counseling for cadets who are on Aptitude Probation (i.e., militarily deficient).

One major difference between the Academy's Counseling Center and those at other institutions is the issue of responsibility, or accountability. At most institutions a counseling center's primary responsibility is to the clients it serves. However, at the Air Force Academy, the Counseling Center's responsibility is to its clients *and* to the institution itself. The Academy is responsible for cadets' total development in a way that other institutions are not, and that places limits and demands upon the activities of the Counseling Center. The challenge has been to provide a climate of counseling which encourages self-exploration and understanding without compromising such professional military ideals as integrity, responsibility, and service. This unique dual nature of the Center's responsibilities was recognized during the Center's embryonic period. Lieutenant Colonel Ofiesh observed that the "counseling service must naturally be related to the purposes and responsibilities of the USAF Academy."³⁶ However, this does not imply that personal counseling therefore becomes the task of making the individual conform to the organization. Rather, the Center's philosophy emphasizes

³⁶G. D. Ofiesh, Memo for Record on the establishment of a counseling center at the Air Force Academy, in E. A. Holt, *History of the United States Air Force Academy, 13 June 1956 - 9 June 1957, 1 November 1978, Document D-51, Tab A, p. 4.*

the development of self-awareness and interpersonal effectiveness, which can enhance effectiveness in organizations.

New Services

Recently the Center has developed a number of outreach programs in addition to the traditional services already mentioned. These programs are preventive in nature. For example, in 1977 the Center first offered an orientation and support program for all basic cadets. This program advised the basic cadets of the existence and purpose of the Center, and it identified those who may be having significant initial adjustment problems. Another recent change in the Center's services has been a greatly increased use of group counseling for specific issues. For example, the Center offers time-limited groups directed to weight reduction, assertiveness training, communication effectiveness, and stress management.³⁷ As just one index of the growth of services over the years, the number of cadet contacts at the Counseling Center during fiscal year 1962 was 888; during calendar year 1977 there were 12,213 cadet contacts at the Center.

Conclusion

In most ways the Department has never been healthier. The Military Psychology Award attests to its quality of work. Furthermore, the sheer amount of Department involvement across the Academy bespeaks effective working relationships with other agencies. The Department is involved widely across the Academy, and even more, its involvement is sought-after.

This provides opportunities to affect cadet lives in significant ways, both personally and professionally; however, the

³⁷"Growth and Development Through Groups," publication of Cadet Counseling Center, U. S. Air Force Academy, 1979.

Department must constantly review its activities to assure it is most productively and creatively contributing toward these ends. A current question is whether renewed emphasis in the curriculum should be placed on factors affecting personal and interpersonal adjustment. One of the early required courses for cadets was called the Psychology of Personal Adjustment, and in the mid-sixties a May-term Family Relations course was offered.³⁸ Some renewed emphasis in these areas is apparent in a number of courses, including a course on courtship, marriage, and family. Considering the stresses of contemporary society, not to mention military life, such emphasis may now be more important than ever. In addition, the Department's direct contributions toward cadet development need not be solely through the classroom experience. In the spring of 1979, an experimental program was developed and offered by the Department for the Commandant. The program was called Squadron Team and Relationship Training (START) and it was an intense, three day experiential workshop for a cadet squadron and the Air-Officer-Commanding. Its purpose was to improve interpersonal relations and organizational effectiveness in the squadron. The results of the workshop were especially positive. This program truly is making a difference in cadets' personal and professional lives. The Department of Behavioral Sciences and Leadership hopes to continue to contribute to cadets and the Academy in other innovative and creative ways in the future.

³⁸Department of Behavioral Sciences, "Yearly Activity Report 1964 - 1965," p. 1.

CHAPTER 21

POLITICAL EXPERTISE AND THE AIR FORCE OFFICER: FUSING PROFESSIONAL RELEVANCE AND ACADEMIC EXCELLENCE*

In the deliberations to establish the Air Force Academy, military leaders and civilian scholars joined together to lay out the needs of the Air Force in a world which they saw as complex and uncertain. They had the opportunity to create a fresh institution. They had the benefit of institutional precedent in the form of the established service academies. They faced uncertainty as to how much precedent should be prudently followed. The postwar world was unique in relation to its preceding era. What may have once been a conflict between the military profession and the realm of political science was now a false dichotomy. While some argued that politics was on the periphery of the prescribed intellectual make-up of a professional military officer, it was clear that politics was at its core as well. To exclude political science from a military academy curriculum would neglect an essential perspective in a cadet's cognitive development. The inclusion of political science and the determination of its scope and content brought with it a set of issues that, over the next twenty-five years, would affect the shape of the discipline itself.

In this context the first twenty-five years of political science at the Air Force Academy is viewed. Any attempt to assess that first quarter century must begin with refer-

*This chapter was contributed by Captain Schuyler Foerster.

ence to the institution's chartering documents. Although designed to shape the overall curriculum, they have shaped the specific discipline of political science with comparable effect. The core concept was that of soldier-scholar: graduates would be officers who could:

- respond to the demands of leadership with wisdom, strength, integrity, and a keen analytical yet common sense;
- balance the requirements for discipline and loyalty, on the one hand, and independence of thought and critical inquiry on the other;
- dedicate themselves to a career of service to the nation, adaptable to revolutions in technology and human ideas alike;
- develop a professional military expertise nonetheless rooted in the foundation of the humanities and the sciences, prepared for unique challenges yet not insulated from the society they serve;
- anticipate the dynamism of the nuclear age, providing direction to the profession based on an intellectual understanding of the future and an operational experience with the past.

In short, the Academy was expected to produce more than junior officers who would distinguish themselves in the operational command structure of a combat force, trained as "specialists in the containment of violence." The 1950 Report of the Service Academy Board to the Secretary of Defense, commonly known as the Stearns-Eisenhower Report, prescribed a "background of general knowledge similar to that possessed by the graduates of leading universities" concomitant with expertise in the techniques of modern warfare. Explicit emphasis was placed on providing a foundation for post-graduate education, thereby building an investment in human capital that could both maintain the fabric of national security in a democratic society and build a

credible and creditable military posture in a fundamentally new strategic milieu.

Political science was integral to this concept of a military professional. The Stearns-Eisenhower Report emphasized that graduates should understand the role of the military in a democratic society and be aware of the broader problems besetting the nation they serve. There remained, however, the issue of how best to accomplish this. In this context, the Service Academy Board's Panel on Social Sciences highlighted a tendency on the part of the established service academies to "impart . . . a minimum amount of information as efficiently as possible." The Panel concluded that such a tendency stemmed from the professionally directed nature of the institution. The Panel advised that greater emphasis be placed on the stimulation of original critical inquiry among faculty and students alike. There was from the beginning a consensus that each graduate should possess a "knowledge of the world about him, an understanding of the people in that world, and a skill in dealing with the people of that world." The proper tradeoffs between prescribed core and optional enrichment courses remained to be resolved.

When the class of 1959 arrived at Lowry Air Force Base in July 1955, the place of political science in the curriculum was not firmly established. The Social-Humanities Division, one of the two initial faculty elements, was to teach the two core courses in political science: a sophomore year sequence in "American and Comparative Foreign Governments," and a senior year sequence in "International Relations." Before these courses were taught, however, changes were made both in the organization and the content of political science at the Academy. Through these and subsequent changes—revolutionary as well as evolutionary, constrained and unconstrained—the identity of political science at the Academy developed.

During the first year that political science was taught at the Academy, it was done within the Social Sciences Division,

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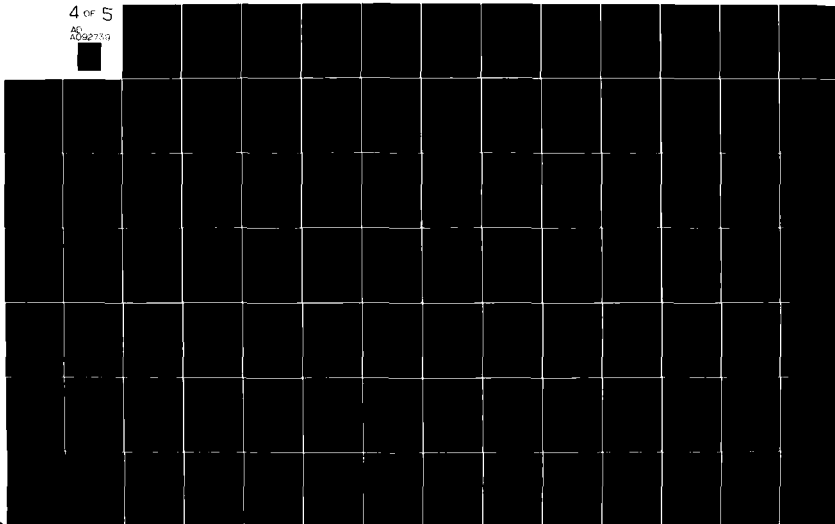
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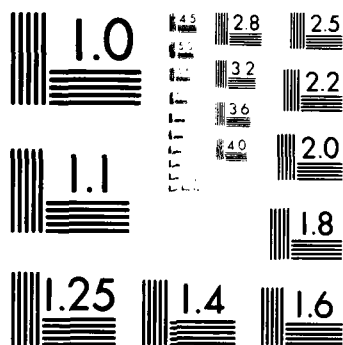
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Office of the Professor of Political Science, which included Colonel Robert F. McDermott as its head, assisted by two other officers. In reality, this office was an amalgamation of the disciplines of economics and political science. Since Colonel McDermott was an economist, the emphasis lay in that discipline. As a result, the curriculum evolved into a somewhat modified form from the original prescription. Instead of two full-year sequences of political science, the sophomore core included a semester of American government and a semester of comparative economic and government systems, the latter course emphasizing economic systems more than political structure; the senior year core, not to be taught for another two years, was to be a semester rather than a year of international relations.

This pattern survived only that year. Academic year 1957-58 saw Colonel McDermott promoted to Dean of Faculty, and the subsequent establishment of a separate Department of Political Science, with a faculty totalling five officers under Colonel Wesley W. Posvar. Part of the impetus for the new department was the initiation in that year of an enrichment program which allowed cadets in advanced academic status to take elective courses in one of four academic majors, including one in Public Affairs. The departmental core remained at three full semesters, reverting to the discipline's orientation of American government, contemporary foreign governments, and international relations. Two enrichment courses were offered as well: "American Political Thought" and "Political Parties." Both of these first electives were designed to fulfill two explicit purposes: first, to provide cadets with a deeper understanding of their own political heritage and the workings of the American political process; second, to provide them with a foundation for post-graduate education.

By the time the Class of 1959 reached its senior year, the political science core curriculum had developed a sequence which would remain essentially intact for most

of the next decade. The department regained its full two years of core by the inclusion of a semester course in Defense Policy in the senior year. That course was designed as a professionally oriented capstone course which, according to the 1958 Self-Survey Report, "integrated the subject matter of all prior history, geography, economics, psychology and government courses."

The department had begun a period of growth, adapting to increased teaching loads as the Cadet Wing came to its full strength of over 2,500 men. By 1961, the department faculty grew to twenty-one officers. Enrichment offerings grew incrementally. In 1959-60, the department offered "Political Parties" and "Political Theory," supplemented by a third offering in "Modern Political Thought" the next year. The more policy-oriented electives remained interdisciplinary in nature through 1961. All of the Social Sciences Division disciplines coordinated in a topical survey course entitled "Problems in Public Affairs," and the Departments of Political Science and Law jointly taught a course on "International Law and Organization."

These first few years were marked in some respects by a continuity with the institutional precedents set largely by the Military Academy at West Point. Indeed, both Colonels McDermott and Posvar had been brought to the Air Force Academy from West Point's Department of Social Sciences. The focus in the curriculum, both Academy-wide and in the department, was on establishing a balanced core. There was less emphasis, and certainly less haste, in creating a spectrum of enrichment offerings comparable to "that possessed by . . . leading universities." But one very significant precedent had been set: there now existed a Department of Political Science in which disciplinary identity coincided with relative organizational autonomy. As noted by Colonel Posvar, "the Department was able to do what West Point's Department of Social Science would have liked to do, but couldn't." In retrospect, the very existence of discipline-based academic

departments was bound to generate pressure for enrichment offerings characteristic of each discipline, whereas the amalgamation of related disciplines might have led to offerings more characterized by a common denominator of interdisciplinary perspectives. In the end, the fact that this relatively new Academy pioneered in the offering of disciplinary academic majors was probably inevitable, if not explicitly anticipated.

Throughout most of the sixties, the department experienced something that is rare in established organizations but not uncommon for new ones: relatively unconstrained growth. Lacking the precedent of a counterpart Political Science Department at the other academies, but using those academies as a reference point, the department was able to ride the crest of general institutional growth and probe the limits of its role in attempting to fulfill the multiple facets of the institution's charter. There was one advantage: as one veteran of the period has noted, somewhat facetiously, "one could justify a new idea on the grounds that it was done that way at West Point; by the same token, one could justify a new idea because it wasn't done at West Point; and, on occasion, one might even justify something with both arguments simultaneously."

In terms of gross numbers, the experience certainly supports the generalization. From a faculty of twenty-two officers teaching four core courses, three electives, and two interdisciplinary electives in 1960-61, the department grew to a faculty of forty-one officers teaching three core courses, sixteen undergraduate electives, one interdisciplinary elective, and four graduate seminars by 1969. Subsequently, the department has experienced a moderate decline in faculty authorizations, until its present strength of thirty-two officers, while the curriculum evolved through continuous review.

The essential variable in developing the identity of the political science discipline at the Academy has been the very nature of its faculty. Established by Colonel Posvar and

developed by succeeding Professors of Political Science, faculty recruitment philosophy has stemmed from a fundamental perspective on the role of the department as an institutional entity. The department could best fulfill the multiple aspects of teaching cadets by demonstrating that the discipline of political science was vitally relevant to both the formulation and execution of national security policy. The best way to demonstrate that relevance was for the department to be directly involved in the policy issues facing the Air Force and the Department of Defense, establishing itself as an intellectual sounding board for the conceptualization of policy. This involvement required that the department discourage excessively long tours, and ensure that faculty members retain their professional ties. Through a continuous screening of a nationwide pool of superlative military officers and the acquisition of necessary authorizations for post-graduate and doctoral education at the finest schools in the nation and abroad, officers are brought into the department with an ability to integrate their respective intellectual and professional experiences. Significantly, a faculty tour has been viewed as a vehicle for placing officers into the professional policy arena. Not only are cadets to be prepared for assuming leadership and policy responsibility in the long term, but the faculty is to be similarly prepared in the near term.

Such a philosophy has paid handsome dividends for the department, reinforced the growth of the discipline both in and out of the Academy, provided immeasurable personal rewards for the faculty, and served the Air Force and the nation with a steady stream of competent professionals from cadet and faculty ranks alike. Past department faculty members have since found themselves as university and college presidents, consultants on foreign and defense policy, Assistant to the President for National Security Affairs, Special Assistants to the Secretaries of Defense and the Air Force, Assistant Chief of Staff of the Air Force, and

have otherwise enriched the operational and policy echelons of the profession. Likewise, cadets majoring in the discipline have historically held an inordinate share of the leadership positions of the Cadet Wing, earned numerous prestigious graduate scholarships, and graduated to careers of comparable excellence.

The substantive developments of the departmental curriculum since the early sixties have occurred alongside specific milestones in the broader Academy program. In 1961-62, the department offered graduate-level seminars designed to provide intensive enrichment to advanced cadets in the public affairs major. At the same time, the department initiated the disciplinary major in international affairs, effective with the Class of 1964. Beginning with the Class of 1963, outstanding cadets in the major were sponsored for a cooperative master's degree program at Georgetown University immediately after graduation. Changed to the Fletcher School of Law and Diplomacy, Tufts University, in 1968, then to the University of Pittsburgh in 1973, the program was terminated in 1976. In 1964, independent tutorials were initiated to allow cadets to pursue subjects with an instructor outside the classroom. Subsequently, beginning with the Class of 1966, the Academy required that all cadets complete an academic major, giving added impetus to the department's already existing program.

In 1969, the Academy and the department began a curriculum review in light of resource constraints caused by the conflict in Southeast Asia. A period of growth was replaced by a leveling of resource commitments, but an innovation in curriculum design mitigated this constraint by maintaining flexibility in course offerings. The previous pattern in which the department offered new courses according to available expertise without regard to the total number of course offerings was no longer possible. In the last ten years, however, the department has offered Special Topics courses on a semester-by-semester basis, thus creating the opportunity to

accommodate cadet interests keyed to current issues, exploit special department expertise, and offer new courses on an experimental basis without disrupting the overall curriculum. As a result, departmental offerings remained relatively stable through the seventies, allowing qualitative evolution while responding to 1975 reductions in total elective offerings with the cancellation of graduate seminars.

The specific form of the political science discipline at the Academy has evolved in the context of these broader milestones. The prescribed core content has remained relatively constant, with attention focused on American government, contemporary foreign governments, international relations, and defense policy. Enrichment programs, on the other hand, have incrementally developed in a fashion mixing both continuity and change. That form consists essentially of five elements—political theory, American politics, comparative politics, international relations, and defense policy. Through an understanding of each element's part in the department curriculum, one can better understand how the department has carried out its institutional role.

To a large extent, the last four of these elements evolved from the core course offerings, and each constitutes an opportunity for cadets to pursue the respective core elements in depth. Indeed, the International Affairs major after twenty-five years roughly parallels these four areas with its option for specialization in American politics, area studies, international politics, and national security policy. Political theory, however, constitutes the glue that holds the discipline together. Its actual course composition has varied largely as a function of efficiency, sometimes covered in a single course, at other times dissected into the classical and modern periods with the latter covering the post-Machiavellian era. Between 1962 and 1974, the department also offered "Contemporary Political Theory" as a graduate seminar to prepare prospective master's program cadets for that opportunity. Until the seventies, the department tended to

emphasize the more traditional approach to political science, with less attention to rigorous consideration of the scope of the discipline and the methodology of theory building. Courses in political theory surveyed the normative views of theorists through the centuries to identify the persistent issues of statehood and governmental function. The exception was a graduate seminar which emphasized the theoretical constructs of the international relations field. Serving as a means to expose prospective graduate students to the behavioralist and systemic approaches current in the literature of the discipline, it was, by the end of the sixties, a course in quantitative methodology, accomplishing for the empiricists of the discipline what the normative theorists had always had in a counterpart seminar. A comprehensive department curriculum review between 1969 and 1971 resulted in a greater emphasis on systemic behavior and empirical methodology. The department agreed that such considerations more properly belonged at the undergraduate level, thus providing cadets a framework with which they could approach the spectrum of enrichment courses available. Beginning in 1972, the department offered an undergraduate course in the scope and methods of political analysis which, alongside the course in normative political theory, still provides the foundation for further study in the discipline.

This emphasis on theory has had an impact on virtually all of the courses taught by the department, including the prescribed core courses and, in particular, systems theory. The concept of a political system integrating the diverse behavioral variables of subnational, national, and international formal and informal actors, has been the framework in which much of American politics, comparative politics, international relations, and defense policy has been taught. The focus, even in the core courses, has thus evolved from the more descriptive aspects of government structure, international events, and policy issues to the more sophisticated endeavor of analyzing and explaining political behavior and the policy process. The

most recent development in this evolution has been an effort over the past two years to redesign the sophomore core curriculum, in response to a requirement to offer three half-semester courses instead of two full semester courses. That process led to a sequence, first taught this academic year, of an introductory course in political science, followed by American government, then international relations. Significantly, the introductory course fills many of the demands for both theory and a survey of contemporary foreign governments by integrating these two concerns into a framework comparing democratic and authoritarian political ideologies and the political systems which result.

Despite the fact that American government was the firstborn of the department, it has evolved much like its prodigal son. The systematic study of the policy process was slow in developing. "Political Parties" has remained an offering since 1957 largely because it afforded a unique vantage point to examine the American political process in all of its pluralistic splendor. But one of the first two graduate seminars offered by the department in 1961, "Public Administration," was not offered again until 1968 and then, as now, as an undergraduate course. A course in American foreign policy was added in 1965 to complement defense policy offerings.

Courses in American politics have come into their own in this decade, reflecting perhaps a visceral as well as intellectual appreciation for the linkage between domestic politics and national security made so manifest in the latter years of the Southeast Asian conflict. The offering of "Public Administration" beginning in 1968 stemmed from an explicit recognition in the ten year accreditation self-study that domestic politics was being neglected. A year later, a course in urban politics was initiated, first as a special topics course and, until 1975, as a regular offering. In 1973, the American politics curriculum almost doubled with the addition of courses on the Congress and the Presidency, plus a graduate seminar in

public policy which fell victim to the cancellation of all graduate courses the following year. Heightened cadet interest in the American political process has generated several Special Topics offerings as well, including courses covering the 1972 and 1976 Presidential elections and a recent course on the politics of energy.

Comparative politics has likewise expanded its role in the department curriculum, providing a framework which subsumes the multiple area studies offerings. Until 1968, the only course that approximated a comparative analysis of governmental systems was the core course in contemporary foreign governments. Largely because it was a core course, it was less comparative politics and more a configurative description of major foreign governments. When the course was dropped from the core in 1968 and became required only for majors in the discipline, it began to include substantial theoretical content, incorporating the structural-functionalism approach advocated by Gabriel Almond and others earlier in the decade. The course now surveys the broad spectrum of theoretical approaches to the study of comparative politics, and exists with the normative and empirical theory courses as one of the conceptual foundations for the disciplinary major.

A major curriculum development of the sixties was the increasing attention to the developing countries of the world, reflecting a significant reorientation of U.S. strategic perspectives, characterized in large part by the new doctrine of flexible response. In 1962, the department offered a course in problems of the developing countries which continued into the seventies. It too adopted the structural-functionalism framework in 1968, but later took on a more issue-specific orientation. It was, however, a harbinger of the area studies movement which came into full bloom during the tenure of Colonel Richard F. Rosser as Department Head from 1967 through 1973. "The Politics of Western Europe" was offered first in 1964, largely to

augment the survey nature of the core. Two years later, reflecting increased American involvement in Southeast Asia, the department added a course on the politics of Asia. While the Academy adopted distinct area studies academic majors, the department, in 1968, added a course on Latin America, split Soviet studies into separate courses on Soviet politics and Soviet foreign policy, and participated in an interdisciplinary capstone seminar in Asian and, later, European studies. With the demise of the separate area studies majors and the interdisciplinary seminars in 1972, the department rounded out its own area studies offerings with a course on the Middle East, using the special topics format to introduce the course. Today, the department retains its area studies courses and offers cadets the opportunity to specialize in the Soviet Union, Western Europe, the Far East, the Middle East, or Latin America within the framework of the international affairs major.

International relations has been a vital and continuing part of the political science discipline at the Academy. Introductory courses have been taught to all cadets since the first class arrived. Elective offerings, however, have varied over the years. Courses in the early sixties tended to emphasize ideological considerations and policy problems, with most of the initial courses focusing on the specific security issues of an essentially bipolar world. A gradual evolution toward more theoretical approaches generated pertinent graduate seminars and, later, an undergraduate capstone course.

As a rule, the department tended to take its cues from the leading universities in the discipline in structuring its elective offerings. In teaching the application of theory in international relations, however, the department broke new ground. Beginning in 1965 and later moved to its capstone course, the department featured a simulation game called "Statecraft," designed by department members to demonstrate the dynamics of the international political system. Meanwhile, as part of the expansion of the academic facil-

ities, a specially designed gaming complex became operational in 1968. "Statecraft" was replaced by "Polidox" (or Political Paradox), also developed by department members, allowing the interaction of roles at the subnation, nation-state, and international systemic levels. Although the capstone course was terminated in 1973 to allow new offerings in American politics, "Polidox" and similar gaming simulations continue to be used in a variety of courses.

Following the retirement of Colonel Rosser, there ensued a four-year interim consolidation of Political Science and Philosophy under Colonel Malham M. Wakin. In 1977 the Political Science Department, now under Colonel Ervin J. Rokke, initiated a new course to fill the gap created by the cancellation of capstone and graduate seminars. A senior seminar in international relations provided a vehicle for integrating both theoretical and policy issues and for preparing cadets for future graduate work. The concept has proved successful and is being applied to the American politics and public policy arena as well.

While international relations provided much of the impetus to the department's initial growth, it is, in the final analysis, defense policy in which the department has made its most profound contributions. Defense policy serves as a synthesis of the otherwise disparate elements of the discipline. This synthesis has been crucial institutionally as well as pedagogically: the parameters of teaching political science at a military academy require that the demands of professional relevance and academic credibility not clash, for in the end the organization would wither either from internal or external dissonance. As part of the curriculum, defense policy provides a focal point for the study of the American political process, comparative politics, and international relations. As part of the political science discipline, it provides the opportunity for the department to lead in the development of pertinent theory. As a forum for demonstrating institutional purpose, it provides a vehicle in which the de-

partment can both educate cadets in the nature of their profession and refine the conceptual skills of its faculty in the policy issues affecting that profession. In short, defense policy allows the department to serve both its academic and professional constituents.

It is important to recall that, in 1960, policy studies as an element of the political science discipline had not yet reached an advanced stage. The specific focus of defense policy was virtually non-existent. Its advent at the Academy grew out of an incremental recognition that a crucial part of a cadet's education had been missing from the initial curricula. In teaching "American Defense Policy" as a core course, the department annually revised its own compilation of readings as it attempted to establish the outlines of a new facet of the discipline. Over the years, its enrichment courses have covered a broad spectrum of defense policy issues: "Defense Policy Formulation"; "Methods of Strategic Analysis"; "Science, Technology and Government"; "Politics of Insurgency"; "Comparative Defense Policy"; "Strategy and Arms Control"; "Impact of High Technology on Defense Policy"; "Civil-Military Relations"; and "Politics and the Profession of Arms." Collectively, these courses have served to highlight current issues, integrate theory and practice, and reinforce the growth of the field.

This departmental effort has, over the years, produced four editions of a textbook on *American Defense Policy* (1965, 1968, 1973, and 1977), two editions of a companion textbook on *Comparative Defense Policy* (1974 and forthcoming in 1980), scores of articles and professional papers in the field, and a substantial contribution to the conceptualization of policy issues within the professional domain. Since the mid-sixties, the department has regularly provided highly qualified faculty and cadets for summer duty to a variety of organizations engaged in the formulation and execution of national security policy. This staff augmentation program has benefitted both the gaining organizations and the Academy,

contributing fresh expertise to the policy process and returning faculty and cadets alike to the classroom with new perspectives on security issues. In sum, it enhances the vital link between the Academy and the profession it serves.

The concept of institutional linkage is an appropriate theme on which to conclude this review of the first twenty-five years of political science at the Air Force Academy. From the beginning, the contribution of the political science discipline to the military profession was never in doubt. But there was little precedent from which one could infer the specific form that contribution would take. Throughout its evolution, the Department of Political Science has been keenly aware of its obligation to fill the variety of requirements established in the Academy's charter. To do so has required that the department fill diffuse institutional roles.

Within the confines of the Academy, the *raison d'être* of the department exists most directly in the classroom. To accomplish that mission fully requires that the faculty integrate not only the teaching of the discipline through scholastic excellence but also the motivation of cadets by relating to their professional environment. In pursuing the former, faculty members remain active in the discipline they teach, contributing to the development of that discipline while insuring the necessary integration of theory and practice in the curriculum. To this end, the department continuously expands its ties to the academic community and actively engages the efforts of all of its members in the continuous review of the curriculum. In enhancing the motivational element of classroom instruction, the department encourages faculty members to be involved in the many facets of cadet life, demonstrating their professional and individual interest in the totality of cadet education and training. Transcending both the scholastic and motivational elements of the department's purpose is continued faculty commitment to the purposes of the profession. The department continues to expand its efforts to support the Air Force and the broader

policy arenas of the national security establishment through research and staff assistance and by preparing competent professional officers to fill their ranks.

The department has thus viewed itself in a crucial role, inextricably linked to those in the government accountable for the formulation of national security policy; to those in the profession charged with managing the instruments of violence; to those at the Academy responsible for military training; and to those in the academic community faced with the continuous refinement of the discipline. Each link is a mutually reinforcing element of the department's mission. It is with this mission in mind that the Department of Political Science approaches the Academy's second twenty-five years.

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THE MILITARY TRAINING PROGRAM

EDITORS' NOTE: *The Commandant of Cadets has a leadership role unique in an American institution of higher education. He is the military commander of more than 4,500 officers and cadets in forty cadet squadrons, responsible for their training, discipline, and professional development. He is the academic department head for a military studies curriculum which prepares cadets for challenging careers as officers in positions of responsibility in the US Air Force. He is the equivalent of a dean of students and director of student personnel services, overseeing cadet dormitories, student government, food services, scheduling, social actions, budgeting, and cadet activities including a drum and bugle corps, cadet publications, and myriad of social activities ranging from a "disco" and snack bar to off-Broadway productions and formal military balls.*

During the first twenty-five years, the Commandant's subordinate organizations have been responsible for conducting formal flying training leading to an aeronautical rating (navigator), parachute training leading to the award of the military parachutist badge, and basic through advanced military training leading to a regular commission in the USAF. The Air Officer Commanding (AOC) and Cadet Squadron Commander serve as an extension of the Commandant, overseeing cadet conduct, performance, and character development both through formal supervision and instruction, and through normal day-to-day interaction. Rather than attempt to describe all of the aspects of the Commandant's function, the papers which follow attempt to convey a sense of the Commandant's involvement in three specific arenas which may be of special interest to the reader: flying indoctrination, formal military training, and cadet professional ethics. The essays dealing with these three aspects of cadet education should provide a flavor of the Commandant's role in cadet education.

CHAPTER 22

AVIATION SCIENCE AND AIRMANSHIP AT THE AIR FORCE ACADEMY: THE FIRST TWENTY-FIVE YEARS*

Introduction

The rightful role of aviation and airmanship studies in the curriculum has been a source of controversy since the earliest days of planning for the establishment of a U. S. Air Force Academy. From a historical perspective, distinguished leaders in the military and in government have participated in three continuing debates: what is the proper content of the aviation curriculum, which cadets should complete aviation studies, and who should have the ultimate responsibility for the conduct of aviation science programs? While frequent review and periodic redirection have not always meant smooth evolutionary development of the "flying" curriculum, they have forced a constant, disciplined self-examination of courses and programs which has strengthened their cohesiveness and served the Academy well. After twenty-five years of responsiveness to a variety of challenges, aviation and airmanship programs remain a vital part of each cadet's course of study, providing a set of flying experiences which integrate key aspects of the Air Force aviation heritage and present day Air Force flying operations with other elements of the cadet's total education.

Today, the Commandant of Cadets oversees programs to provide light plane flying experience in the T-41 aircraft

*By Captain Robert J. Sallee and Captain Richard H. Stark.

for pilot-qualified cadets and crew experience in the T-43 advanced navigation trainer for all other cadets. Aviation Science Division personnel operate the Academy Planetarium, the Observatory, pilot instrument trainers, and navigation trainers; provide inflight instruction on T-43 jet aircraft; and oversee eleven courses in astronomy, avionics, navigation, and pilotage. Airmanship Division programs are embodied in fifteen courses which offer basic and advanced instruction in gliders, pilot indoctrination (T-41), and parachuting. These programs offer selected cadets an opportunity to qualify for commercial and flight instructor glider ratings; private, commercial instrument and flight instructor airplane ratings; and the military parachutist badge and a civilian instructor parachutist rating. In the pursuit of providing an aviation background to all cadets, flying activities are complemented by military studies and leadership programs and by aspects of more traditional studies in mathematics, physics, astronautics, aeronautics, and other academic disciplines. The continuing importance of aviation science and airmanship at the "Flying Academy" is reflected in the high percentage of graduates who attend pilot or navigator training (77% to 82% for the Classes of 1975 through 1978). Aviation/Airmanship course work is today a core requirement for every cadet. The background and evolution of aviation and airmanship at the Air Force Academy during the first twenty-five years should serve to provide educators and military leaders with insight into the range of possibilities and some of the issues which exist in the education of future Air Force officers, commanders, and policy makers.

Early Planning

Since the Military Aeronautics Department of the U. S. Army advocated the establishment of an Air Force Academy in 1918, and through Congressional debates on proposed legislation between 1922 and 1947, aviation studies have been considered a desirable and important part of the cadet

curriculum and experience. In 1947, Congressman Paul J. Kilday of Texas proposed to the Secretary of the Air Force that an Air Force Academy be established which would devote the cadets' entire training to professional matters rather than to "elementary education subjects." Mr. Stuart W. Symington responded to Congressman Kilday's suggestion by indicating that the Air Force was considering a course which would cover one to two years duration and provide instruction in technical subjects peculiar to the Air Force. The concept at that time called for civilian institutions to be used for the general education of USAF officers.

In August 1948, General Muir S. Fairchild, Vice Chief of Staff of the Air Force, designated Air University as the "Air Force Agency responsible for the preparation of plans for the establishment of an Air Force Academy." (9) With the help of fifty-five distinguished civilian and military educators, a twenty-six man Air Force Academy Planning Board established by Air University completed an objective and detailed examination of all available material relating to the establishment of an Academy. In January 1949, the Board published *A Plan for an Air Force Academy* reflecting what they considered the best approach to "procuring and training American youths to provide the requisite strength of officer personnel highly trained in the art of military aviation and possessed of character and ideals to guide the United States Air Force." (1:ix) Their plan called for the Air Force Academy to be an undergraduate institution conferring a B.S. degree, with a curriculum designed "to offer a broad general education as well as a sound background in aeronautical science and tactics." (1:5) It was recommended that specialized officer (technical) training not be provided since such activity was the subsequent responsibility of other Air Force commands. (General Hoyt S. Vandenberg, Chief of Staff of the Air Force, had disapproved an earlier Air University recommendation that an Air Force Academy provide a five-year course of instruction and had approved a recommend-

ation that pilot training *not* be accomplished at the Academy.)(25)

The Dean of Faculty organization was originally outlined as having three subordinate divisions: Humanities, Science, and Military Studies. The Division of Military Studies was to include departments of "Air Science and Tactics Instruction" and "Health and Physical Education Instruction."(1:25) (All educational activities, academic and military, were to be placed under the Dean of Faculty; the Commandant of Cadets would wear two hats. He would chair the Division of Military Studies and be separately responsible for administration, personnel services, and discipline of the cadets.)(1:33)

The curriculum of the Division of Military Studies proposed by the Air Force Academy Planning Board was to include a single course specifically oriented to aviation topics: Tactics 300. Conducted during the ten week summer session following the sophomore year, Tactics 300 would include "basic instruction on the characteristics and employment of military aircraft, basic principles of air operations, procedures and problems of bombing, navigation, and gunnery, (and) . . . ten hours of air indoctrination flying at a suitable Air Force base."(1:137) The course would also include a field trip or trips during which cadets would observe various military activities firsthand.

The Planning Board published Volume II of their study—*The Curriculum*—in May 1949. One principle followed in the structuring of the curriculum was that the technical aspects of Air Sciences would be taught in courses offered by the Division of Sciences; the Division of Military Studies would not attempt "to impart scientific or technical knowledge."(2:217) Tactical courses, like Tactics 300, would be considered "non-classroom" courses used for application of the knowledge and principles discussed in the classroom. Among the specific objectives cited for Tactics 300 (objectives which are still valid today) were as follows:

"to provide opportunity for the Air Cadet to learn through 'first hand' experience and observation . . .

"to familiarize the Air Cadet with the characteristics and employment of military aircraft; basic principles of air operations; procedures and problems of bombing, navigation, and gunnery

"to afford the Air Cadet opportunity to get the 'feel' of flying" (2:289)

This early intention to embody the aviation experience in a single course was dramatically changed five years before the Academy admitted the first cadets.

In March 1950, the policies that had been governing the preparation of the curriculum with emphasis on the academic phases were reoriented Carl Vinson the Chairman of the House Committee on Armed Services came out against having an Air Academy that did not teach cadets how to fly. He told the Secretary of the Air Force, W. Stuart Symington: 'I am opposed to the establishment of an Academy that is simply to have the purpose of giving students a general college course, and thereafter teach the cadets aviation elsewhere.' . . . shortly afterwards the Secretary of the Air Force told General Spaatz that 'after very careful consideration,' he had decided, 'that the Air Force Academy curriculum should include appropriate phases of flying training!' (10:473-474)

This new orientation was evident in the curriculum of the new Academy which was activated at an interim location at Lowry AFB, Denver, Colorado, on 14 August 1954. (10:194)

The Infant Academy

The first entering class of Air Force cadets participated in the official dedication ceremony of the USAF Academy

on 11 July 1955. (10:216) The new emphasis—training professional military aviators—was apparent in the remarks made during the dedication ceremony by Secretary of the Air Force Harold E. Talbott:

The iron realities of the atomic era demand that the Air Force be ready at any instant to execute crucial tasks. . . . the burden upon individual airmen has become greater than ever before. . . . Today *one* of our jet bombers carries more destructive power than a fleet of *ten* thousand World War II bombers. . . . This unusual concentration of destructive power requires unusual men to handle it successfully. . . . Only the compulsion and discipline of *duty* drives a man to the completion of his task Thus, it is to the *human* element that the Air Force Academy is dedicated, and especially to the *leadership* we must have if our country is to survive (10:217)

Clearly the man most responsible for shaping the original program of aviation course work at the infant Academy was Lt General Hubert Reilly Harmon, the Academy's first superintendent. General Harmon and his staff worked in Washington, D.C., prior to the 1954 activation of the Academy, then at Lowry AFB, to formalize the curriculum, training programs, administrative procedures, and public information necessary to support an institution of higher learning. General Harmon advocated as much flying training as possible, without sacrificing the essential parts of the academic curriculum and stated: "The mission the Air Force is to produce airmen, and I think it is proper to add well-rounded airmen: airmen with a background of experience and a basic appreciation of all aspects of airmanship" (10:491-492)

In Jan 53, at the insistence of Gen Harmon, a board of general officers convened in the office of the Deputy Chief of Staff, Personnel, to determine (reconsider) the

role of flying training in the curriculum. The board unanimously resolved: (1) that a bachelor of air science degree should be given to a graduate of the Academy; (2) that a concept of 'global indoctrination' should be an integral part of the curriculum; and (3) that the curriculum should be so devised as to produce airmen rated as aircraft observers who had at least 'completed the pilot training now included in the Phase I Primary Course.' (10:465)

Having thus introduced formal flying training into the Academy curriculum, General Harmon and his staff set about providing instructors and a course of instruction to implement the observer program. The requirements for aircraft, trainers, and the Spitz Planetarium were established in 1954, and Air Training Command was asked to provide any training equipment they had in excess of their needs.

By June 1954, flying training had become an accepted part of the curriculum of the proposed Air Force Academy. On 2 June 1954, Col T. H. Holbrook, Chief, Flying Training Division, DCS/P, stated the status of flight training as it existed at the end of the pre-Academy planning period. He said: 'All graduates of the Air Academy will be qualified as aircraft observers. All students will be qualified as navigator-bombardiers; failure to complete aircraft observer training at the Air Academy will mean elimination from the Academy. Air Academy students will be given familiarization with light plane flying as pilots, but will not be qualified as AF pilots upon graduation. Thus, all Air Academy graduates will be aircraft observers; a large percentage will go on to pilot training, but failure to obtain a pilot's rating will not affect the Academy graduate's commission.' (10:496)

General Harmon also made sure that the word on flying training was spread throughout the civilian community.

Gen Harmon felt that (speeches to civic and educational groups to attract candidates) should emphasize that Acad-

emy instruction led to a Baccalaureate Degree, but that they should not detract from the airmanship program; the impression still remained that this was primarily a flying school. The Academy Superintendent also felt that these briefs, and other information sent out by the Academy, ought to include some information on the sort of boy desired for Academy cadetships . . . and that speakers should avoid making it appear that graduates would be observers rather than pilots. There was no doubt that the graduates of the Academy would be expected to continue on for pilot training upon graduation. (10:322)

Eligibility requirements for candidates for the first class of Air Force Academy cadets were established to support the emphasis on pilot qualification. These included: "must be medically qualified for flying . . ."; "must qualify in a . . . Pilot Aptitude Test." (10:333, 335) Although these requirements were contested at the time, they remained firm, since "the objective of the Air Force Academy was to provide 'air-minded professional combat leadership,' and a reduction of physical qualifications would not be in consonance with this objective." (10:338, 339) Thus, in 1955 "AF policy demanded that the prospective cadet 'have a reasonable chance of completing the navigation training given during the four-year Academy course and the pilot training to be given after graduation.'" (10:343)

The emphasis on flying was also reflected in criteria established for the selection of the faculty. The original faculty was selected to insure a balance of rated and non-rated officers—the goal was a 50-50 split. When the final appointments were made, twenty-nine or 53% were rated; twenty-five or 47% were nonrated. (10:408, 411) In July 1955, Brigadier General Don Z. Zimmerman, the first Dean of the Faculty, changed the balance, requiring that 60% be rated. (10:411)

In January 1954, the curriculum and staff were organized to accommodate the emphasis on flying. The "Airmanship Program" was aligned under the Commandant of Cadets with

four principal activities: (1) the "Basic Training Division," (2) the "Physical Training Division," (3) the "Flying Training Division," and (4) the "Leadership Division." (10:467) The Academy course of instruction (all of which was prescribed) included the following total contact hours for each cadet (10:468):

TABLE 23-1. Course of Instruction

<u>Academic Curriculum</u>	<u>Contact Hours</u>
Social Humanities	1,548
Scientific Division	1,629
	<hr/> 3,177
<u>Airmanship Division</u>	
Basic and Leadership Training	958
Physical Training	373
Observer Training	645
Pilot Training (Phase I)	200
	<hr/> 2,176
Total	5,353 hours

With this kind of emphasis, the Airmanship curriculum (flying training, military training, and physical training) was regarded as "the prime function" of the Commandant of Cadets. (10:815) Navigation training was conducted by the Flying Training Division. (3:9) The pilot indoctrination program was presented at civilian contract bases during the third class summer. (7:7)

For the first entering class of cadets, the Flying Training Course included 137 hours of instruction during their freshman year. The summer training period included thirty hours: eighteen for physiological training, eight for orientation to navigation and flying equipment and aircraft instruments, and four hours of "practical flying." The summer course presented crew discipline, inflight emergency drills, crew member responsibilities, and introduction to the physical characteristics of the T-29C aircraft. The academic semesters provided an airmanship program of dead reckoning navigation (forty-nine hours) and four flight hours, to be integrated with fifty-four hours of associated navigation studies in the academic curriculum. (10:833)

The flying training program was designed to run through all four academic years and summer periods. The first class started this program, completed the summer training period and began the training scheduled for the first academic year when . . . the program was cancelled . . . with the realization that the cadets had too great a workload. The Superintendent introduced this problem to the Academy Board and, following a detailed discussion of where cuts could be made, they decided to reduce navigation training to a three year program Under the original plan the work was far too scattered and the instructors met their classes so seldom that it was difficult to achieve any continuity in the program of instruction. When the courses were revamped into two years of ground training and three of flying training the situation improved. (10: 838-839)

Evolution of Aviation Course Work

In February 1957, an additional syllabus of instruction which would provide a three-year pilot training course was proposed. The course was to include eighty-four flying hours of instruction, sixty-six hours of ground school, and would cost \$565,000 annually. A light civilian aircraft was to be

used. Additional programs which were proposed during this period included:

- A two-year pilot training program
- A six-month primary pilot training program
- A one-year primary pilot training program
- A T-34 primary screening and indoctrination program
- Light plane flying training
- Pilot indoctrination
- A different light plane flying program

The Superintendent, Major General James E. Briggs, in a letter to DCS/P on 23 May 1957, commented, "Of the nine different courses in this study, only the voluntary light plane flying course is considered feasible for implementation at the temporary Academy site. Furthermore, in reviewing all of the proposed courses of training, it is evident that certain types of pilot training should not be employed at the Academy due to the high cost of new facilities, etc." As a result, he recommended that Hq USAF approve the voluntary light airplane training as a government subsidized course for the fall semester 1957. In June 1957, Hq USAF indicated nonconcurrence with the proposed program, citing funds and the doubtful future value of studying pilot training. An interim program was not deemed advisable. The Headquarters further requested that USAFA restudy this matter after a reasonable period of operation at the permanent site, and then submit their comments.

Three classes of cadets received navigator-observer wings upon graduation—the first three classes which entered the Academy at Lowry AFB in 1955, 1956, and 1957. The Class of 1962, which entered in 1958, and subsequent classes did not receive the aeronautical rating of navigator (nor any other aeronautical rating) during their cadet education and training. The Academy had reached the end of an era.

The "beginning of the end" for graduating rated aircrew members came with the movement of the Cadet Wing from

Denver to the permanent site for the Academy near Colorado Springs in the late summer of 1958. As reported by the Chief of the Flying Training Department in 1961, the Academy's continued conduct of "a full scale navigation training program ran into obstacles." (7:7) The primary obstacle was the increased distance between the new "Cadet Area" and the T-29C aircraft, which remained at Lowry AFB. Flying scheduling, which involved all cadets and Academy flying personnel, took on entirely new dimensions. Two hour bus trips were required each way to transport the cadets and instructors the 65 miles to their flying training base. What had been a difficult and challenging workload before the move became nearly impossible with four hours of extra travel time. Another factor which gained new proportions because of the move was cost. The Navigation Division reported that transporting personnel to Lowry "added considerably to the per capita cost of instruction." (7:8) In addition, Major General W. S. Stone, appointed as Academy Superintendent in 1959, had reportedly received "a strict injunction from the Chief of Staff, USAF, to reduce the per capita cost of instruction to a point approximately the same as that at West Point and Annapolis As a result, the controversy over the nature and scope of flying training now shifted from what type of training would actually be best as a foundation for future careers to per capita cost and motivation." (7:8)

The end of offering cadets "primary skill training" in aviation did not come without a struggle. There were still many advocates of full scale pilot and navigator training courses at the Academy. Members of the faculty and staff, the cadets, members of Congress, and a variety of others argued for a program to provide the requisite pilot and navigator training, and aeronautical ratings, to all qualified cadets (along with a twenty million dollar runway and airfield under one proposal) even in the face of demands to reduce the costs of cadet education. The Air Force Academy Board of Visitors made recommendations supporting con-

struction of an airfield and development of a light plane flying program in almost every report issued between 1956 and 1966. The first Board of Visitors included many distinguished persons, among them General Carl Spaatz, USAF, retired; Brigadier General Charles A. Lindberg, USAFR; four U. S. Senators; five Congressmen; two college presidents; and a corporate chairman of the board. (16) The report of their first visit in April 1956 indicated: "The Board is unanimous in its opinion that the military training program of the cadets should include pilot training in light aircraft." (16:11)

In August 1958, the Superintendent sent to Hq USAF a study on how a flying program in light aircraft similar to the Reserve Officer Training Corps (ROTC) program could be conducted without adversely affecting the hard-core academic and military curriculum at the Academy. A program was subsequently developed and submitted to the Chief of Staff, USAF, which would provide a cadet with 71 hours of flying instruction in the T-34 and 114 hours of ground instruction over a three-year period. Hq USAF replied in November 1958 disagreeing with a three-year, 70-hour approach as being too slow an exposure to pilot training. They recommended that the Academy investigate the ROTC program, possibly offering a course under Civil Aeronautics Administration (now FAA) regulations to firstclassmen. Lt General Briggs answered indicating that the Academy would be delighted to have such a program. The General Officers Advisory Committee met and recommended:

- a. A pilot training program should be included in the curriculum at the earliest possible time.
- b. Navigation training should be phased down as the new program was implemented.
- c. Funds should be made available to construct a facility to support primary pilot training.

In January 1959, Lt General Briggs forwarded a revised flying training program to Hq USAF supporting the concept

of a light plane flying program. This proposal included pilot indoctrination for all second class cadets and primary pilot training in the T-37 for first classmen who had successfully completed the pilot indoctrination course. On 18 December 1958, President Dwight D. Eisenhower wrote Secretary of Defense Neil McElroy and indicated that after reviewing the 1958 Board of Visitors' report, he was "not in favor of either a flying training program or an airfield at the USAF Academy."

In January 1959, however, Brigadier General Lloyd P. Hopwood wrote Lt General Briggs and indicated that Hq USAF was reluctant to terminate flying training at the Academy. Unaware of Eisenhower's views, he further indicated that Academy objectives should include:

- a. Lightening the load of the present navigation program.
- b. Continuing a valid requirement for heavy aircraft at the Academy.
- c. Arriving at a program pointed to pilot duty and advanced manned systems.

On 23 January 1959, General Hopwood authorized the Academy to coordinate with ATC to develop a pilot training program and a course in missile technology. On 30 January 1959, President Eisenhower's letter to Secretary McElroy (along with comments from the Director of Legislative Liaison) was forwarded to the Superintendent. The evolution of flying programs at the Air Force Academy was entering a turbulent era. During the Spring of 1959 a number of significant upheavals in the Academy's flying curriculum took place. ATC failed to indorse the primary training program for Academy graduates due to the difficulty of programming such a large number of people into the UPT program at the basic training level. The Academy then attempted the "May Term" concept. Under this concept, two 17-week academic semesters would be followed by military training during the month of May and a 10-week summer period. May Term

was proposed to permit a primary pilot training program to be started in May of the second class year. The proposal was presented to the Air Council in December 1959. At the same time, the Board of Visitors recommended that primary pilot training be introduced at the Air Force Academy. In their 1959 report, the Board stated that pilot training

. . . would add materially to the motivation of individual cadets and to their future value as officers. The land for and airstrip was included in the original land acquisition program and is now available on the Academy site. The Board again strongly urges that the Academy be authorized to construct a suitable airfield at the earliest possible date to carry out primary pilot training. The cadet time required for primary pilot training is available from that now devoted to the extensive navigation program. (17:11)

Members of the Board expressed their belief that pilot training was "contemplated as an integral part of cadet training" (17:11) when the Academy was authorized. In spite of the recommendations of the many proponents of formal flying training, however, the aviation pendulum began to swing toward a nonflying emphasis.

The movement of the pendulum away from formal flying training gained additional momentum from a change in entrance requirements which allowed young men not physically qualified for pilot training to compete for admission. Then, on 25 September 1959, Lieutenant General Truman H. Landon, Deputy Chief of Staff, Personnel, Headquarters, USAF, gave it a decisive push when he wrote to Major General William S. Stone, to express concern over the role of flying training at the Academy:

The greatest diversity of opinion surrounds the question of skill training at the Academy I tend to believe that the real problem lies in the fundamental and sincere split between specialization in military skills and broad,

general preparation for a career Until this is solved, we can expect a continuing series of studies without the conclusive and positive results you need for sound planning. . . I welcome your comments. (11)

General Stone's answer to this letter embodied a new philosophy which has provided an important basis for aviation emphasis which remains today. Among other things, General Stone wrote:

In this era of rapid technological development I think we would be best advised to devote maximum time during the four-year cadetship to broad fundamentals. By concentrating the efforts of all cadets on that portion of the program . . . which involves space technology, we would be giving them more basic educational material in a fast developing area that will be within the future responsibilities of them all Specific aeronautical skills they can get in the Training Command (when) required; basic space education most of them will have to get here If we could add anything more to enhance this environment without interfering with the accomplishment of our fundamental purpose and without subjecting ourselves to undue criticism, I would say that a light plane flying program with a minimum flying facility would fill the bill. A program somewhat in excess of that presently given ROTC students is what I have in mind. I think I am not being inconsistent in proposing a light plane program because I look upon it as motivational rather than a skill training program. There is an intensive desire on the part of the overwhelming majority of cadets to get into the air. As an airman of the present and a spaceman of the future, I believe that early in his career a cadet should be given the opportunity to get off the ground. I believe that this kind of experience is enough, along with his education, his daily contact with officers, and his field trips to stimulate an aero-space mindedness and an eagerness to pursue a career in the Air Force. (23)

On 17 December 1959, a presentation was made to the Air Force Council "to obtain a policy statement on the type of Flying/Space Technology training program" to be conducted at the Academy. (12) Council recommendations called for pilot indoctrination of approximately forty flying hours in light aircraft (for cadets physically qualified and volunteering for pilot training); navigator indoctrination of approximately forty flying hours in T-29 aircraft (for cadets physically qualified and volunteering for navigator training); flying indoctrination including ten flying hours (for remaining cadets); and space technology indoctrination for all cadets. (12) Flying "indoctrination" was to replace training, and cadet participation would be determined by physical qualification. The lack of a suitable airfield at the Academy caused resolution of the light plane flying program to be delayed well into the sixties. The dedication of the Academy Planetarium in January 1959, on the other hand, allowed for the space technology emphasis to take hold almost immediately.

The Academy Astronomy Program (24)

It was not surprising that the idea of training in space technology fell on fertile ground. The launch of Sputnik I in 1957 crystallized the notion that space was not only reachable, but also was important to the security and well-being of the nation. Aviation in the fifties relied heavily on celestial navigation, which was an integral part of the navigation training at the infant Academy. The Planetarium's original mission was to aid in teaching star identification, celestial motions, and space coordinate systems. This role was rapidly expanded. The first pure astronomy course, "Descriptive Astronomy," was developed in the fall of 1959 and offered as an enrichment elective, emphasizing the interaction of the many sciences which are a part of astronomy. Working closely with other academic departments, the Planetarium personnel developed effective educational

programs for a variety of academic subjects. During the first twenty-five years, special planetarium programming has been designed for lessons in physics, biology, electrical engineering, geography, astronautics, English, fine arts, comparative religion, foreign language, fire safety, the history of flight, mechanical engineering, and, of course, astronomy and navigation.

As the first major planetarium (50' dome) between Chicago and San Francisco, the Academy Planetarium also generated considerable public interest, becoming a major attraction for visiting dignitaries and the general public. This attention not only provided increased recognition and stature for the Academy as an educational institution, but also aided the planetarium staff in further developing the many capabilities of a planetarium. The steady refinement of the Planetarium's academic programming in the 1960's was accompanied by expanded use of the Planetarium for teaching special classes to public school groups from the elementary grades through college-level. Scouting groups and a variety of other public service organizations also took advantage of the educational opportunities of the Planetarium. Staff members were called upon to be judges at local and state science fairs, and to provide information on request to astronomy enthusiasts from across the country. In conjunction with NASA, the Academy Planetarium was used to train and evaluate Skylab astronauts in manual space navigation procedures and equipment. Local news media called upon the Academy Planetarium staff for background information and feature material on happenings in space, all of which has served to publicize and advance the academic and scientific bent of the Academy as a whole.

Flying Gains Academic Respectability

The Curriculum Committee, the Faculty Council, and the Academy Board devoted the early part of 1960 to resolving, defining, approving, and implementing the "Flying/Space

Technology" training program. The USAF Academy Board met on 19 February 1960 to consider and act upon this program, and the results of their meeting established the curriculum for the next several classes. These results included:

- (1) A mandatory space technology program for all cadets consisting of four semester hours. (This was an addition to the six hours of astronautics required for all cadets.)
- (2) A mandatory pilot indoctrination program for all cadets consisting of 10 flying hours and 10 hours of ground school.
- (3) A voluntary program of pilot screening for all cadets physically qualified and desiring further pilot training consisting of 30 additional flying hours and 30 additional hours or less of ground school.
- (4) An elective alternate program of navigation indoctrination for those cadets not taking the pilot screening program, consisting of 30 hours of flying and 60 hours or less of ground school.
- (5) An elective alternate program for those cadets not participating in (3) or (4) consisting of 2½ semester hours of enrichment courses. (21:3)

It was decided that, until a pilot indoctrination and screening program could be implemented at or near the Academy, all cadets after the Class of 1961 would take the mandatory space technology program and, depending on their desires, either the navigation indoctrination course or 2½ semester hours of enrichment courses. Incidental changes included provisions for Physiological Indoctrination Training. At the end of this transition period, the emphasis on flying in the curriculum was much reduced, with less than 30 semester hours (SH) devoted to nontraditional course work. (21:6) The total semester hours presented, by areas of emphasis, are reflected in the following table.

TABLE 23-2. Curriculum Comparison

	Flyers		Nonflyers	
Academic Program	144 1/2	SH	147	SH
Airmanship Program	24 3/4		24 3/4	
Flying Program	3 1/4		3/4	
Athletic Program	12 1/2		12 1/2	
Total	185	SH	185	SH

With General Stone's reorientation of aviation education at the Academy also came a reawakening of the issue of who should be teaching navigation and space courses to the cadets. Since navigator ratings were no longer a part of the flying program, it was argued that the associated course work properly fell under the purview of the Dean of the Faculty. Partly because of the major changes taking place in aviation emphasis at this time, the Academy was ripe for a change. The Superintendent thus transferred the Department of Navigation from the Commandant of Cadets to the Dean of Faculty on 14 June 1961. This idea was not originated by General Stone, but had been passed on by his predecessor:

During his tenure as Superintendent, Maj Gen James E. Briggs had made a careful study of the Academy's program of instruction. He concluded that all education should be under the Dean of the Faculty. He told his successor . . . that if his tour had been extended another year, he planned to transfer Military Studies, Navigation and Leadership Studies (Psychology) to the Dean and leave all instruction that was purely training under the Commandant of Cadets. General Stone studied the program of instruction for two years and came to the same conclusion. He, however, did not go as far as Gen Briggs had recommended. Physical Education remained with the Department of Athletics,

whereas Gen Briggs had considered placing it under the Dean of the Faculty. (4:79-80)

The philosophy that all academic courses work should be presented by the Dean had been recommended by the Air Force Academy Planning Board in 1949, and it appeared that a concern which had been an issue then was finally being satisfied. The Department of Navigation was thus reassigned under the Division of Basic Sciences. However, after only thirteen months of operation, the Navigation Division was "returned to the control of the Commandant of Cadets (on 15 July 1962). The scope, content, and instructional hours devoted to the navigation (and astronomy) courses remained the same." (1:143) The official histories, both of the Navigation Division and of the Academy as a whole, are silent on the reasons which motivated the Dean to return responsibility for flying programs to the Commandant; yet, the concept of the Dean's overseeing all academic material has remained alive to this day.

Under the electives available through the Flying/Space Technology Program, two hundred fifteen cadets of the Class of 1962 selected Navigation 470, the navigation orientation course in lieu of an enrichment course. It was estimated that 70% of succeeding classes would also select navigation, until such time as a light plane flying program was implemented at the Academy. (7:13) No doubt as a result of the large enrollment by cadets in navigation, Brigadier General Robert F. McDermott, Dean of the Faculty, initiated another review of flying in 1963, which again reduced emphasis on aviation training. In a letter entitled "Deletion of Navigation from the Academy Curriculum," he wrote:

... on 17 December 1959 ... the Air Force Council approved a navigation indoctrination program 'for those cadets physically qualified and volunteering for further navigation training.' It has been our practice to ignore the

policy approved by the Air Force Council, and to allow cadets an option of either navigation indoctrination training or a military history course, regardless of their physical qualification or desires for further navigation training. The results of a recent survey of the Class of 1965 indicate that 342/575 (69.5%) desire to take the navigation option next year. On the other hand, only 45/575 (7.8%) meet the Air Force Council criteria, i. e., are physically qualified for and volunteer for further navigation training. In conjunction with the Commandant of Cadets, please prepare a proposal to delete navigation indoctrination training from the curriculum. (13)

It is interesting to note that the Council action occurred in 1959, the Dean absorbed the program in 1961, returned it to the Commandant in 1962, and then proposed its deletion in 1963. Thus, in response to a Council action which had occurred exactly four years earlier, the curriculum was again revised:

A majors for all program was instituted. Flying training was de-emphasized. Navigation 470 might be used as an elective in the military affairs major, or as an overload or an enrichment course in the other major fields. Starting with the Class of 1968 (the tenth graduating class) and thereafter, cadets majoring in civil engineering or engineering sciences would have no free options. Majors in humanities, international affairs, or management would have only one free option and basic sciences would have two free options. Cadets pursuing an elective would require overloads with no options. As Navigation 470 would have to be taken as an overload, the Department of Navigation anticipated that few members of the Class of 1968 and subsequent classes would participate. (6:251-252)

Now the flying program had gone full circle, from an aeronautical rating to an option for all to an option for few. The program had been taught under both the Dean of the Faculty and the Commandant of Cadets.

Birth of an Airfield

As a follow-up to the Flying Training/Space Technology Program, the Academy submitted a new proposal for an airfield to support the pilot indoctrination, this time at a projected cost of \$1,100,000. The Board of Visitors again indorsed the indoctrination concept in 1960 and urged the Air Staff to take immediate action to obtain approval for an Academy airfield in the Fiscal Year 1961 Military Construction Program (MCP). The General Officer Advisory Committee concurred in this position. In the fall of 1961, the subject of the type of aircraft to be used in a pilot indoctrination program was investigated. The General Officer Advisory Committee recommended approval of an Academy proposal for a 10-hour interim program using the Cessna 150 or its equivalent subject to the approval of the airstrip proposal. The Committee recommended that the Air Staff endeavor to provide the aircraft in time to implement the program in May 1962.

However, in the spring of 1962, the Chief of Staff concurred with an Air Council decision to disapprove the interim 10-hour program for fear of jeopardizing the construction of the ultimate airfield. The Academy then submitted a new proposal (for a one million dollar airfield) to support pilot indoctrination. Due to the concurrent proposal to increase the Cadet Wing strength to 4,500, Secretary Zuckert directed that the one million dollar proposal be scrapped and that the Air Staff come up with a facilities support package of less than one million dollars. To bridge the gap for the Class of 1963 in terms of pilot indoctrination, a voluntary 15-hour T-37 indoctrination program was worked out with ATC.

In December 1963, the Chief of Staff announced the beginning of an Air Force-wide economy program. The Superintendent submitted five items for cost reduction. One of these was to delay the plans for the light aircraft indoctrination program at the Academy.

A major change of emphasis occurred in early 1964, when

staff personnel from the Academy learned that Hq USAF Civil Engineering (AFOCE) would accept and favor an airfield project at the Academy which would not exceed five million dollars. During this same period, USAFA/DO asked Hq USAF "to propose, negotiate and obtain FAA approval by 27 March 1964 of planned airspace utilization in support of flight operations at this installation." This request was necessary to ensure the reservation of necessary airspace to conduct cadet pilot training, and "avoid embarrassment with local zoning commission." The Cadet Soaring Club also wanted to begin local operations at this time. Plans were also made to expand the T-33 indoctrination program in lieu of the summer TDY T-37 program at ATC bases.

During April and May of 1965, the Academy, ATC, ADC, and the FAA required planning data for conducting the Cadet Pilot Indoctrination Program. This concept included using Peterson Field as the primary base and using Butts Army Airfield at Fort Carson and the Academy airstrip as auxiliary bases.

The syllabus of training projected for use in this program would provide pilot-qualified cadets with 36.5 hours of flight training in the T-41A aircraft and the opportunity to earn an FAA private pilot certificate.

By the beginning of 1966, the only avenues that were open to a cadet in order to gain pilot skills were limited light plane and soaring programs. In both cases the cadet had to pay for this instruction (e. g., \$9.00/hour for light plane training) out of his own pocket. There also existed an indoctrination program in jet aircraft and a basic parachuting program. One of the Academy's goals for this year was to expand all of the airmanship programs and especially the light plane program.

In order to accomplish this goal, a new Airmanship Division was created on 1 July 1966. The Airmanship Division had the responsibility to supervise all the aviation courses except navigation training. Navigation training, Planetarium and Observatory operations, and aircrew training devices

were retained by the Navigation Division, later the Aviation Science Division. The organization of the Airmanship Division was the first attempt to legitimize and organize all flying operations into meaningful units; parachuting, soaring (gliders), and light aircraft programs were previously run as club activities.

The 1967 Report of the Board of Visitors heralded this reversal of the trend toward de-emphasis of flying with the gratification that the envisioned light plane flying program for First Class cadets would be initiated in 1968. The Board of Visitors also recommended that the planned program be expanded to include qualification for an FAA pilot's license as well as military pilot training qualification. (18) The T-41C light plane flying training program was entered by 223 members of the Class of 1968 during their final semester before graduation. (19:9-10) The course consisted of 36½ flight hours and 33 hours of ground training, similar to Phase I of the Air Force Undergraduate Pilot Training; flying was conducted at Peterson Field east of Colorado Springs until such time as the Academy airstrip construction could be completed. The fact that only half of the pilot-qualified cadets that year were able to complete T-41 training (there had been a lottery for assignment to the new program) provided dramatic evidence that the training was not only highly successful but also cost effective. Total attrition from pilot training for members of the Class of 1968 was 39; only four of the cadets who had completed the T-41 training failed to complete pilot training (two of these were eliminated for medical reasons); the remaining 35 who washed out did not have T-41 training. (20:8)

Similar success had been experienced in connection with the Navigation 470 course prior to the advent of light plane flying. Cadets who had completed this course had an attrition rate in pilot training of less than 10%, according to one study during 1966-1967, compared to almost 25% for those not taking the course. (26:4) The Board of Visitors in 1968

recommended expansion of the Navigation Indoctrination Course (Navigation 470) to make it a requirement for all non-pilot qualified cadets:

The Board recommends that the Academy give serious consideration to making this course mandatory for all cadets who do not participate in the T-41 program. Not every cadet who is graduated from the Academy will pursue a rated career. All, however, will be working with rated personnel throughout their service careers and should possess some understanding of the duties and responsibilities of the various aircrew members and the teamwork required for the accomplishment of a successful mission. Navigation 470 can provide this experience. (19)

The Secretary of the Air Force endorsement, dated 31 July 1968, supported this recommendation:

We concur with the Board's recommendation that the Academy give serious consideration to making Navigation 470 mandatory for all cadets who do not participate in the T-41 program. Every cadet at the Air Force Academy should receive maximum exposure to aircrew activities. Requiring all cadets to actively participate in a flying program will keep the Wing flying oriented and will maintain the desired identification with the 'Fly and Fight' mission of the Air Force. (22)

Again, it would take several years for the Board's recommendations to be put into action. Completion of the T-41 Pilot Indoctrination Program became an entrance requirement for Undergraduate Pilot Training beginning with the Class of 1969. The important philosophical aspect of this action was to legitimize pilot training as a *required* part of the Academy curriculum. Training was conducted from Peterson Field which, as with the earlier navigation program, again necessitated extensive travel time for cadets. The

existing airfield facilities at the Academy were still used for soaring, parachuting, and light aircraft club activities. Once again it was recognized that a comprehensive flying program could be conducted at the Academy only if extensive construction was added to the present facilities.

Thus a reconcerted effort was made during 1968 to gain Congressional approval for construction of expanded facilities at the Academy. Club enrollment for soaring, parachuting, and light aircraft continued to be limited by facilities and equipment.

Slight impetus was added for an enlarged Academy facility by a July 1969 report from the Air Force Safety Team:

- "1. During June 1969, 19,651 aircraft movements were recorded at Peterson Field.
2. This density requires extremely complex traffic patterns and procedures for T-41 operations.
3. Action should be initiated to enlarge, improve, repair and equip the Academy airfield to adequately handle the entire T-41 operation."

Also during 1969, initial inquiries were made into freeing some cadet academic time for other Airmanship programs in addition to the Pilot Indoctrination Program. Thus, a familiar subject was raised which would resurface many more times.

During 1970 and 1971, Lt General Albert Clark had several communiques with the Air Staff dealing with the Airmanship programs and the existing facilities. In mid-1971, General Meyer, Vice Chief of Staff, encouraged General Clark to submit a request for expanded facilities as part of the 1973 Military Construction Program. Congressional debate ensued.

Public Law H. R. 11418 was passed by Congress on 25 October 1972. This act contained funding approval for expansion of the existing airfield facilities. Now aviation training could begin to provide pilot indoctrination training to cadets *at the Academy*.

The main Airmanship activity during 1973 was the construction of two runways, two operations buildings, three hangars, and a new control tower. Club activities for soaring, parachuting, and light aircraft were severely limited by the construction, but the enthusiasm for them was not dampened. Airmanship programs were finally given a physical manifestation of permanence.

The Pilot Indoctrination Program moved to the Air Force Academy lock, stock and barrel during March 1974. With the total operation highly visible, it became time for the remaining Airmanship programs to observe the same operational constraints followed by the T-41 program. An immense study into Air Force regulations and requirements, Federal Aviation Administration rules, and normal Air Force operating procedures was initiated in 1974 and completed in 1975.

In addition to aligning the Airmanship programs with the "rules," this study forced a realization that all of the programs must totally support the Academy mission. A tangible outcropping of this study was the establishment of an Airmanship mission statement: "To provide a practical application leadership laboratory through which all cadets may be exposed to the air-oriented environment, and to motivate those physically qualified cadets toward a rated career in the Air Force." Although this fact may not seem significant, it was psychologically important to the development of aviation training at the Academy to "have said it."

The "air-oriented environment" was broad enough to encompass a variety of diverse new programs. Programs such as parasailing, ballooning, and hang-gliding were formalized in 1975. An awkward growth period often gives rise to some features which experience proves to be inappropriate, as it did in this case. Hang-gliding was subsequently prohibited for cadets. Parasailing was found to be too time intensive and was discontinued after two years. Ballooning was very expensive per cadet flying hour and proved to present too

high a rate of incidents. It has also been eliminated as a formal program. Although these actions may seem to imply a haphazard approach to aviation training, in reality these programs were well-conceived and implemented in an attempt to provide the best possible set of aviation and airmanship experiences to the cadets. Now it is possible to say "we tried that before."

This plethora of activities continued to bring to light the cadets' insatiable desires for aviation-related experiences. Thus, the most beneficial result of this period was the scheduling of academic time during the fall and spring semesters for some of the newer Airmanship programs in addition to T-41 flying.

From 1968 to 1975, aviation science programs saw comparatively minor changes. Programs were updated, an Advanced Navigation course and an Avionics course were introduced. In 1975, the T-37 was approved for cadet jet orientation programs, replacing the T-33. That same year, navigation flights were begun in the T-43, which replaced the T-29. Synthetic trainers were updated to support flying in the T-43 aircraft and to provide T-37 instrument flight (pilotage) orientation; the planetarium replaced the Spitz projector with Viewlex-Minolta Star projector; and a freshman orientation ride in the T-43 was instituted. Then in 1976, another major revision in aviation emphasis put the flying program into its current form.

Aviation Science and Airmanship Today

The emphasis on aviation reached its present state with the establishment of an "Aviation Core" requirement; a requirement that all cadets complete a flying course in either pilot or navigator indoctrination, as a graduation requirement. This "Core Requirement" was one of the key recommendations to come out of the USAF Academy "Twentieth Anniversary Study on Curriculum and the Cadet Way of Life" in 1975. (8) T-41 training fulfilled the core require-

ment for all cadets qualified for and planning to attend pilot training; Aviation 460, a new course akin to Navigation 470 but offered during the summer, provided both pilot (instrument flying) and navigation (dead reckoning) orientation for all other cadets. The Navigation Division was redesignated as the Aviation Science Division. Aviation Physiology was transferred from the Department of Chemistry and Biological Sciences (Life Sciences course) to the Aviation Science Division. The goal of the aviation core requirement was to

. . . ensure that all cadets receive an adequate exposure to the Air Force flying mission. It is expected to affect 120 cadets who (did not previously) voluntarily enroll in a graded flight course. (15)

At the end of the first twenty-five years, the Airmanship and Aviation Science Divisions provide cadets with an aviation background through actual flight experience; parachute training; and studies in astronomy, soaring, avionics, navigation, and pilotage. The Academy Planetarium, the observatory, pilot and navigation synthetic trainers, and T-43 and T-41 aircraft give cadets the "firsthand" experience, familiarization with air operations and the "feel of flying" which have been considered so important since the early days of Academy training. New navigation trainers and a new observatory are upgrading the quality of the aviation science programs. New aviation orientation and introductory space science courses are providing broader aviation/space technology experiences to sophomore cadets. The goal is to provide an aviation experience to each cadet during each of his or her cadet years. This experience is still considered vital to an aerospace Academy, whose uniqueness lies in its mission to develop career-minded men and women to assume the awesome task of managing the United States Air Force.

Issues

As the Aviation Science Division reaches the completion of the Academy's first quarter century, three issues are as alive today as they were when the Air Force Academy Planning Board first met to sift and sort the arguments of the previous three decades: What is the proper emphasis on aviation topics for an undergraduate Air Force Academy? Who should have the responsibility for teaching aviation material to cadets—the Commandant of Cadets or the Dean of the Faculty? (And what should be their relationship?) Which cadets should participate in which aspects of aviation training? (Should all cadets be exposed to flying activities, or only those so physically qualified? Should women cadets receive orientation to air operations to the same extent as their male counterparts while legislation currently restricts women from combat duty?)

The question of what training is to be presented may well be shaped in the future as it has in the past, more on the grounds of cost than through an objective determination of what is best for the education and motivation of cadets. For example, the termination of the T-37 flying program (for cost reasons) has necessitated a re-thinking of Air Training Command validation of Navigation 471 (*Advanced Navigation*) as a substitute for the initial phase of Undergraduate Navigator Training by Academy cadets. Course content has been significantly changed to meet original course objectives without use of the T-37. It should also be clear that much of the reorientation in the aviation emphasis in the past has also come as an extension of the beliefs and personalities of the individual Commandants, Deans, and Superintendents. Commander prerogative will continue to shape the content of the aviation programs.

The issue of who will conduct aviation training is also alive today. An Air Command and Staff College Research Report in 1978 addressed the relationship between the Dean of the Faculty and the Commandant of Cadets, which has not always been effective.

The literature describing the events of the first seven years of Academy history accentuates cooperation and communication between the staffs of the Commandant of Cadets (CW) and the Dean of Faculty (DF)—a team approach. Joint committees are frequently established to resolve common issues. Each organization obtained the other's opinion. Curriculum was coordinated before the plan of instruction was finalized or abandoned . . . Dialogue was always present. A close interface best describes the working relationship. After the Military Studies Department was relocated from DF organization to CW in 1962, the military training literature was conspicuously quiet. No mention is made of cooperation. Curriculum coordination is absent from the literature. Cooperation and coordination seem to have simply stopped. CW and DF appeared to stand in separate camps, each organization accomplishing its own responsibilities. This was a strange relationship after the initial years of cooperation. (14:185)

One aspect of the rift between DF and CW may be that both must compete for the cadet's time. Secondly, there is a difference in assignment policies between the two functions. Assignment to the Dean requires at least a Master's degree and carries a four-year tour of duty. Assignment to the Commandant does not require a Master's degree (although most assigned officers have one), and normally carries a three-year tour of duty. Tenure is offered exclusively to faculty personnel to provide continuity to academic course work; there is no tenure policy in effect for personnel assigned to the Commandant of Cadets. These are the kinds of issues still being discussed in 1979.

The issue of which cadets should take which courses is an open-ended debate. Cadets mandatorily enrolled in aviation courses (when they are not qualified for flying training) feel about the same as Astronautics majors enrolled in humanities core courses. The issue remains—what is the basic objective of the Academy curriculum? Are there certain

requisite skills or experiences which apply universally to all cadets, regardless of physical qualification for rated or combat duty?

These issues can never be resolved absolutely. The Aviation Science and Airmanship programs will continue to change through subtle shifts in emphasis and through the addition and deletion of individual courses to reflect new technologies, values, or the ideas of new instructors. At least for the time being, however, the focus on aviation studies is that embodied in the recommendations of the Curriculum Review Committee Report of 1975, the "Twentieth Anniversary Study":

Some exposure to aircrew duties should be a graduation requirement for all cadets. (8:1-1)

Cadets should participate in an aviation program during each of their four years at the Academy regardless of their eventual assignment upon graduation. (8:1-2)

This, after all, is what distinguishes the Air Force Academy as an institution of higher learning devoted to the development of professional Air Force officers.

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Military Training Division

CHAPTER 23

MILITARY STUDIES: 1955 TO 1979*

All members of the Academy staff share an inherent responsibility to participate in the military training of the Cadet Wing. However, the Commandant of Cadets is assigned specific responsibility to direct the formal military training curriculum—which ultimately leads upon graduation to a regular commission in the USAF.

Practical leadership training during the academic year is conducted by the Squadron Air Officer Commanding (AOC) under the leadership of the Deputy Commandant for the Cadet Wing (CWD). Classroom instruction in military studies during the academic year and field instruction during the summer months are primarily conducted by personnel assigned to the Deputy Commandant for Military Instruction. The result is a four-year-long military education program which reinforces classroom instruction with real world experience and ample opportunity for leadership training.

The Academic Year Curriculum

Academic instruction in the military sciences for fourth class cadets has remained essentially the same since the Academy's inception. This first course forms the basis for the remaining years of instruction. It describes the mission, organization, and purpose for the United States Air Force. When first taught in 1955, the course included instruction of the organization and function of basic Air Force units only

*By Captain Charles J. Whitechurch and Captain N. Don Harmon.

up to wing level. Subsequent years saw expansion of the course to include organization and function of the total Air Force and of the sister services. Instruction on ballistic missiles was developed and presented in the course for the first time during 1962. By 1972, the course was divided between the Air Force's and our sister services' rockets and missiles. In 1973 the traditional organizational presentation was modified to a functional approach which addressed the international scene and the military's role. Characteristics and tasks of air power on a global scale were discussed with specific emphasis on the Far East, Southeast Asia, and Latin America. While the emphasis on basic Air Force organization has remained a common element of all fourth class military studies, the program continues to be adapted and updated annually to provide relevant and useful information.

A military studies course in leadership communications has been part of the military training curriculum for the past twenty-two years. First taught in 1957, the course prepared the cadet for future instructional duties by developing the skills needed as a speaker and classroom instructor. As part of the course, each cadet conducted a 15- to 20-minute class. The instructors came from varied backgrounds, including Air Officers Commanding, military training officers, and instructors from the Department of Navigation (now Aviation Science Division). From 1967 until 1976, the course was known as "Command Communications" and evolved from a pure instructor training course to one which emphasized various forms of communication. Cadets were instructed and evaluated on a wide variety of oral and written exercises including informative and persuasive speaking, talking papers, staff studies, conferences, problem-solving, and teaching exercises. Each cadet videotaped one or more oral exercises as a training aid for additional personal evaluation. The most recent change to the Command Communications course occurred in the fall of 1976. Communication skills were eliminated from the military studies curriculum as a result

of the Twentieth Anniversary Study conducted in 1975. This study determined there were areas of overlap between the Faculty and the Military Training Division curricula. One specific overlap area was identified as the basic communications skills. As a result, the Deputy Commandant for Military Instruction and the Department of English and Fine Arts agreed to transfer the persuasive speaking portion of military studies to the Department of English. Thus, the current military studies course taught in the third class year is but one semester long and is taught during the spring semester. It continues to emphasize those instructor skills which have been taught since 1957. In addition, half of the course is devoted to military problem-solving and solution reporting. The major student exercises are an individual teaching lesson and a team decision briefing which prepare the cadets for future activities as upperclass cadets and junior officers.

Two optional military studies courses were added to the second year curriculum in 1978. MS-233, *Interpersonal Communications*, was designed to raise individual cadet awareness of the process of communication and was taught with the assistance of the Office of Information. MS-250, *Career Opportunities*, concentrated primarily upon those non-flying career fields available to Academy graduates immediately after graduation. The objective of MS-250 was twofold: first, to familiarize the cadets with the duties and responsibilities of officers in the various support fields in order to foster appreciation for these fields, and second, to help nonflying cadets select an academic major and an appropriate career field for active duty service.

The current military studies course taught to cadets in their second class year differs significantly from the course envisioned in 1955. At that time, the third year course was to focus on the specific commands of the United States Air Force in preparation for field trips during the following summer. By 1962, the course had been expanded to include studies of the world situation, foreign air forces, allied

military forces, and communist forces. This basic format was changed in 1973 when employment planning exercises were added to the course curriculum. Today, MS-320 remains a two-semester course required of all second class cadets before graduation. The first semester includes an introduction to the foundations of military leadership through an examination of command and staff authority and responsibility. Cadets receive an introduction in this course to the characteristics of air power and to USAF doctrine. The second semester focuses on U. S. Air Force operations today. The students investigate present USAF operational capabilities and study strategic and tactical air power. Employment planning exercises and seminars on current USAF problems are also held.

An optional course was also added to the third year curriculum in 1978. MS-333, *Unmanned Strategic Systems*, covers in twenty lessons the capabilities, deployment, and peculiarities of unmanned systems; discusses the implications of the Strategic Arms Limitations Talks (SALT); and presents information on the missile career field.

The senior year in military studies has traditionally dealt with the topic of officer transition, although the course format has varied from year to year. It has always included discussion of such topics as personal finances, service uniforms, military career management, first assignment actions, and temporary duty. The current course is twenty lessons long. The first half of the course deals with the practicalities of working day-to-day in the Air Force, while the second half focuses on long-range topics such as the career decision, OERs and selection boards, career planning, assignments, and retirement. The classroom instruction is closely paralleled by the officer transition status of the senior cadets during their final month at the Academy.

Summer Military Training

While the actual duration of various summer training programs has varied over the past twenty-five years, all

cadets have traditionally been required to complete some military training during the summer months. The program which has remained the most constant over these years has been Basic Cadet Training (BCT). This program, which currently begins on the last Monday in June and terminates the second week of August with the beginning of academic year, is the new cadets' introduction to the Academy and to military life. Basic Cadet Training is commanded by a senior member of the Commandant's staff, usually one of the Group AOCs. The BCT Commander is responsible for coordinating a cooperative training effort among the Commandant's staff, the Military Training Division, the Department of Athletics, and Dean of Faculty departments. As a major component of the training process, the Military Training Division conducts classroom and field training in a variety of areas. These areas include, but are not limited to, military heritage, land navigation, first aid, and Leadership Reaction Course. The committees which provide this training are composed of upperclass cadets teaching under the leadership of Military Training Division officers and officer augmentees from the Dean of Faculty. In this way, Basic Cadet Training serves as a leadership laboratory for the upper classes while imparting necessary instruction to the newly arrived basic cadets.

Survival training has also been an important part of every class's summer training curriculum. While the particular format of the survival training has varied at times, the program has been relatively stable since 1970, the year the Survival, Escape, Resistance, and Evasion (SERE) Program was accredited as an Air Force Survival School. Cadets now accomplish all of their survival training during a three-week period of their third class summer. Included are classroom presentations, water survival training, a code of conduct training exercise, field training, and a field exercise. Training sites are on the Academy grounds and at Saylor Park in the Pikes Peak National Forest.

All cadets without prior military service now participate in Operation Non-Com, a three-week temporary duty (TDY) to a CONUS Air Force base. The objective of the program is to introduce the cadets to the role of enlisted personnel in the Air Force. This training is accomplished by assigning cadets to enlisted roommates who are members of the permanent party of the host air base. The cadets are then detailed to duty with various base-level organizations. Typical of the organizations most satisfactory for this training are the security police, base civil engineering, and flight line maintenance squadrons. The program is a relatively new one, having begun on an optional basis in 1971, but it has become one of the most valuable military training programs the Academy offers. Comments from cadet participants and NCO supervisors alike attest to the high value of this unique opportunity to expose future officers to enlisted life.

The third class summer also signals the availability of certain optional programs. The Airmanship Division of the Commandant's Deputate for Operations offers an entire range of programs extending from glider training to freefall parachuting. The Army and the Navy have also traditionally offered a limited opportunity to participate in such programs as Airborne Training at Fort Benning, Georgia; RECONDO Small Element Leadership Training at Fort Carson, Colorado; and Open Circuit Scuba Training at NAS Coronado, California. The cadets' final two years of summer military training combine these optional programs with leadership experience as cadre members in the Basic Cadet Training Program and in the SERE Program.

Military studies continue to be an important aspect of every cadet's training. Although the substance of some programs has changed over the years, others have remained remarkably constant. Leadership skills, self-discipline, and the ability to write and speak clearly are as important to an officer's career today as they were at the Academy's founding. Successive Commandants of Cadets have stressed

the necessity to maintain the high quality of this training in basic skills while at the same time providing military training which addresses the questions of the current day.

Cadet Professional Ethics Program

CHAPTER 24

**USAFA - 25 YEAR HISTORY:
CADET PROFESSIONAL ETHICS***

Of all the traditions proudly guarded by the Air Force Cadet Wing, the one valued above all others is the Cadet Honor Code. Throughout the history of the Air Force Academy, cadets and graduates alike have overwhelmingly endorsed the Honor Code and stated that living under it is an important and rewarding aspect of cadet life. The Honor Code was adopted by the first class to enter the Academy. In 1954, the USAF Academy's first Superintendent, Lt Gen Hubert R. Harmon, appointed a study group to examine the honor codes and systems in use by other institutions, including the United States Military and Naval academies, Virginia Military Institute, and others. The group developed a basic code which was accepted by the Class of 1959 in September 1956. The Code, modeled after that of the U. S. Military Academy, stated "We will not lie, steal, or cheat, nor tolerate among us anyone who does." That statement of fourteen words has remained unchanged although modifications have been made to the Code's administration.

Mission

The ultimate mission or goal of the Code relates to that of the Academy: to develop exceptional officers. The code is an effort to influence cadets to live honorably so that

*By Lieutenant Colonel John Fer and Captain Ben Pittman.

they will graduate with and maintain high professional standards of individual honor and integrity. Designed as a minimum standard of conduct, the Code is considered by cadets to be realistic and reasonable. The Honor Code was intended to lay a foundation upon which the cadet could build personal integrity while seeking to improve upon the individual concepts of honor and ethics already established. The standards of conduct apply at all times, in every place and in every situation. By making the Code all-encompassing, cadets have established a true standard that is more than a mere formality to be observed occasionally.

Administration of the Code

Honor Code administration was originally performed by a small group of cadets called the Cadet Honor Committee. Members were elected by their fellow cadets, two from each squadron. The first committee consisted of eight primary members and four alternates. During the early years, Cadet Honor Boards were heard solely by eight first class Honor Representatives. After an Honor Review Committee examined the system in 1978, a change was made to establish a jury of twelve cadets in good standing who had been randomly selected from the Wing-at-large. The jury is moderated by either the Chairperson, Vice Chairperson, or Deputy Chairperson of the Cadet Professional Ethics Committee; this position is without vote.

Under the previous system, the eight Honor Representatives unanimously had to find a violation; under the jury system only nine votes are required for a violation finding. The purpose of the jury system is to provide a more meaningful opportunity for members of the Cadet Wing to participate in the Administration of the Code. "Discretion" remains a viable part of the Code's administration and provides a flexibility necessary for decisions where lack of maturity might be a major contributor to the offense. As a result of this latitude, and with the Commandant's concurrence, a

cadet may remain in the Wing without prejudice after a honor violation. Prior to the fall 1965 semester, Honor Code Hearings were closed proceedings. Beginning in 1965, the hearings were open to first and second classmen. Then in the fall 1966 semester, hearings were open to all cadets regardless of class. The option of requesting a closed board is still available to the suspected violator if he or she desires it to be so. In addition the Chair retains the authority to close a Board if his/her judgment deems it appropriate.

Recent changes now allow open evidential hearings but provide closed jury deliberations in order to promote an atmosphere of frank and open discussion. In the early years between 1956 and 1961, there existed only one sanction for a cadet found in violation of the Honor Code—a request that the cadet tender his resignation from the Air Force Academy. However, from the very beginning there was a feeling that this ruling should be tempered.

Discretion

Even though “discretion,” as it was later called, was first presented to the Wing in 1958 and each subsequent year, it was not until the fall of 1961, after Wing-wide discussion on the subject, that USAFA cadets voted to grant “discretion” to certain fourthclass cadets who had committed “trivial” violations of the Code during the fall semester of their freshman year. At the beginning of the 1965-1966 academic year, this practice was extended to all classes and throughout the year. The concept of “discretion” has been based upon exceptional cases where the cadet demonstrated high standards of honor apart from a violation of the Code. Additionally, he must have undergone a significant reassessment of his behavior, and resolved to live honorably in the future. The advent of discretion provided a humanizing and tempering aspect to the administration of the Honor Code.

Professional Military Ethics Education

Instruction in the Cadet Honor Code has existed since its acceptance by the Cadet Wing. Following the establishment of the original Cadet Professional Ethics Committee in 1960, there have been continual attempts to present the broader spectrum of professional military ethics against the backdrop of the Cadet Honor Code. As early as 1964 a revolving four-year program in professional military ethics education existed at the Air Force Academy. Throughout the ensuing years the co-existence of the Cadet Honor Committee and the Cadet Professional ethics Committee provided instruction in the two areas within the context of Wing Training and other special periods of instruction. Of course, education in the Honor Code and Professional Ethics has existed for many years during Basic Cadet Training (BCT). Although the broad subject of ethics includes honor and the Honor Code, the past approach had created an apparent dichotomy between what was "ethical" and that which was "honorable." In large measure this separation in cadets' minds was due to the distinct independence of the Honor Committee and the Cadet Professional Ethics Committee. Previous BCT honor and ethics instruction as well as that during the academic year was presented by the Honor Representatives from their perspective, and the Cadet Professional Ethics Representatives from theirs. In an effort to draw the two concepts of ethics together, the committees were combined into a single Cadet Professional Ethics Committee whose responsibilities were to teach and administer the Honor Code. In addition to the efforts of this committee, there are courses taught under the auspices of the Dean of the Faculty and the Commandant of Cadets which deal with the topics of professional military ethics. Under the Commandant of Cadets, specific lessons in professional ethics are given in five military studies courses. Under the Dean of Faculty specific topics are taught in at least eight academic courses as well as the core course in ethics (Philosophy 310). The

goal of the expanded program is to capitalize upon the things already being done and to develop beyond those a coordinated and expanded program of ethics education.

In addition to curriculum-oriented ethics training, a new Squadron Professional Ethics Advisor Program was developed in 1979 to bring the subject into the squadron training program. Forty highly qualified senior captains and junior majors were carefully selected to become Squadron Professional Ethics Advisors (SPEA) and teach ethics in the squadron environment. All were volunteers from the staffs of the Dean, the Commandant, and the Director of Athletics. They were selected based on operational experience, interest in professional ethics, and the desire to become heavily involved with the cadets in the squadron setting. The SPEAs greatly support the CPEC and the Air Officer Commanding by providing weekly lessons dealing with different aspects of honor and ethics as they apply to the Cadet Wing and the Air Force.

To enable the cadets to more closely identify with the Honor Code, a new summer course for all first class members of the Cadet Professional Ethics Committee was initiated in 1979. The course provides concentrated education in teaching skills using updated and improved materials. Additionally, special training in the tasks required of Ethics representatives in the administration of the Honor Code was included. Additional plans extended the opportunity to discuss ethical issues to permanent party personnel at the Academy. Seminars on professional ethics are now being conducted for AOCs and SPEAs.

Moral development is a lifelong process. The opportunity to live under the Honor Code provides an environment of trust and mutual respect in which the internalization of ethical values can be accelerated. Theories of moral development predict growth in ethical values whenever opportunities exist for open discussions of critical issues. The new ethics education program is designed to provide a full spectrum of opportunities to discuss professional military ethics in

both formal and informal arenas. The goal is to enhance and reinforce the institution's values esteemed by the military. The Superintendent of the Air Force Academy, Lt Gen K. L. Tallman, recently supported the new ethics education programs by stating:

Air Force officers must acquire those skills which contribute to an understanding of the major instruments of national power as well as the flow of events which have shaped the historical and current perspective of national security. Their skills must also include the technical background which will prepare them to deal with the ever-increasing sophistication of advancing technologies and their impact on the modern military organization. Equally important, officers must learn the essential values of honor, ethics, loyalty, duty and service to country as well as the dynamics of leadership. This mix of skills should serve the essential needs of the Air Force both now and in the future.

To accomplish its goals, the Air Force needs officers who possess a firm intellectual grasp of ethical matters. They must know and appreciate the standards and values of the military profession. They need the skills to deal with ethical issues wherever they are encountered. Ethics education is a major factor in the professional development of officers. To the extent that the institution succeeds in this crucial effort, the graduated cadet should possess an informed understanding of the moral implications of being a professional officer in the U. S. Air Force.

Honor Incidents

In the 25 years since the Academy was established there have been three Honor Incidents: 1965, 1967, and 1972, in which large numbers of cadets were found in violation of the Cadet Honor Code.

The first incident, in 1965, was exposed by a cadet who was intent upon resigning and involved 109 cadets, among

whom a large number were members of intercollegiate athletic teams. The incident centered on academic cheating and when exposed revealed the existence of well-organized groups of cadets who were stealing and disseminating material contained in examinations. Of the total, 105 violated the Code by cheating while four were found in violation of tolerating. The violaters were frequently interdependent in their efforts to gain unfair advantage of others on the examinations frequently both for friendship and for financial gain. Most of the cadets came from the first or second classes of only a few squadrons. Following the 1965 Incident, a number of steps were taken to rectify the situation which precipitated the violations of the Honor Code. Foremost among them were improved academic security, different examinations on alternate days, and the establishment of a position on the Commandant's Staff for a commissioned officer directly concerned with advising the Cadet Honor Committee. A further modification to the examination schedule was made in 1976 to ensure that examinations were different for morning as well as afternoon meetings of the same course. The newly created Executive Officer for Honor and Ethics was given responsibility to advise both the Honor and Ethics Committees. When the two committees were combined in 1978 following the Honor Review Committee's recommendation, the position was redesignated Executive for Professional Ethics. The 1967 Honor Incident also involved academic cheating; 46 cadets resigned. The 1972 incident resulted in the resignation of 39 cadets for stealing, cheating, and toleration—or a combination of the three. Violators of the Code frequently cited and continue to cite the unrealistic nature of the non-toleration clause as one of the reasons for their violation. Such descriptions as "ratting," "tattling," or "squealing" are used to describe nontoleration. This thinking is most frequently the result of a different standard outside the Academy.

Continuing the Code

Since the adoption of their Honor Code, the Air Force Cadet Wing has accepted the challenge to maintain high standards of integrity despite the fluctuations of society. The influences and interactions between life at the Academy and life in the nonAcademy environment cannot be ignored, but the necessity to resist diluting or reducing the standards which the Academy has established and which the American people expect of its military officers must remain. During its first twenty-five years, the Academy has seen the nation move from a world of so-called innocence to one of "reality." Regardless of terms the United States requires and expects an Air Force of the highest competence and integrity. Reality means recognition of our goals and objectives, training to meet them, and in doing so maintaining the highest standards of personal and organizational integrity. To say that non-toleration is unworkable or unrealistic is to deny the special responsibility of the United States military to preserve the American way of life, including the safety of each member of society. No organization charged with such awesome responsibilities can fulfill them if it is based upon anything less than the highest integrity.

THE ATHLETIC PROGRAM

Department of Athletics

CHAPTER 25

LEADERSHIP THROUGH ATHLETICS*

Upon passage of the Air Force Academy Act in 1954, a nationwide publicity program was developed to acquaint the youth of America with the opportunities offered by the newly formed Air Force Academy. In an ABC-TV news release Lt. General Hubert R. Harmon announced that selected talent scouts were sent to a great number of high schools in the country to seek "The Rhodes Scholarship type" of young men who had "intelligence, personality and leadership." "However," said General Harmon, "we will not exclude a young man simply because he happens to have a little athletic prowess."¹ Those words, although partly said in jest, have had a significant influence on the type of young people who have been appointed to the Air Force Academy. An effort was, in fact, made to recruit Rhodes Scholarship type scholar/athletes who possessed strong mental, physical, and moral characteristics. As a result, during its first twenty-five years, twenty Air Force Academy cadets have received this coveted honor. This chapter, "Leadership Through Athletics," outlines the three basic organizations that comprise the Athletic Department and generally outlines how each (physical education, intercollegiate athletics, and athletic facilities) has functioned to develop cadets in the

*Compiled by Major Eugene L. Miranda, Future Associate Professor of Physical Education

¹Department of Physical Education Briefing, 1976.

image of a Rhodes Scholar. Few individuals ever achieve this prestigious recognition, but it is indeed an admirable goal for which to strive.

"Leadership Through Athletics" also includes sections on philosophy and future aspirations pertaining to programs that might be improved and expanded as funds become available.

This chapter is not intended to be an all-inclusive history of the Athletic Department from 1955 to 1979. Rather, it is a general discussion of the philosophies that have influenced significant changes and how the various programs of today differ from those originally designed.

Physical Education Program

Initial Planning. In September 1955, members of the Department of Physical Training under the Commandant of Cadets completed planning for a physical education curriculum and requested that a group of professional consultants be asked to validate their work. The physical educators selected for this task were Dr. William L. Hughes, Temple University; Dr. Harry A. Scott, Columbia University; Mr. Dennis K. Stanley, University of Florida; and Mr. Joseph R. Rodgers, University of Massachusetts. These consultants passed the curriculum with high marks.

In formulating plans for an Air Force Academy, the physical well being of the cadets was held to be of foremost importance. The development of athletic facilities proved to be no exception, for an obvious effort was made to build one of the finest and most functional athletic plants in the world. The only major oversight was that the facilities were designed to support an all-male student body of 2,400. In 1968, the indoor facilities had to be enlarged to facilitate an additional 2,000 cadets, and in 1976 additional alterations were made to accommodate the admission of women.

Evolution of the Physical Education Department. The Department of Physical Education started out as the

Department of Physical Training under the Commandant of Cadets. Lt. Colonel William C. McGlothlin was the first director of physical training and observed the physical education program at the U. S. Military Academy for five months prior to taking his position at the Air Force Academy.

The original planning by the physical education panel had recommended that the Department of Athletics and physical education be kept separate for a variety of professional reasons. Their principal assumption was that football carries a strong influence and may unfavorably affect administration of the physical education program. Other factors were also considered and as a result, separate responsibilities were clearly outlined and the two programs were not merged. As time progressed, it was evident that both departments were using many of the same facilities and there was joint usage of personnel as instructors and coaches. It was not long before Brigadier General Robert M. Stillman, Commandant of Cadets, realized that "it is not organizationally sound to divide a man such that he has several masters, dual positions, and divided loyalties." In 1959, Colonel George Simler, the Director of the Office of Athletics, requested that the Department of Physical Education and Office of Athletics be combined. As a result of Colonel Simler's recommendation, an Ad Hoc Committee was formed to review manpower savings and equipment utilization. After reviewing the findings of the Ad Hoc Committee, the Superintendent, Lt. General James E. Briggs, made the decision to combine the two departments in spite of considerable objection by the Director of Physical Training.

During the Academic Year 1960-1961, General Briggs made an extensive study of the Academy's entire program of instruction. He concluded that all education should be under the Dean of the Faculty and recommended this change to the incoming superintendent, Major General William S. Stone. Superintendent Stone studied General Briggs' recommenda-

tion but decided to leave the Department of Physical Education under the Department of Athletics rather than place it under the Dean of the Faculty. From an organizational standpoint, the Office of Athletics (which was originally under the Chief of Staff) upon receiving the Department of Physical Training from the Commandant of Cadets became a separate mission element. Thus, the original two mission elements, Dean of the Faculty and Commandant of Cadets, were joined by a third mission element, the Director of Athletics, and have been successfully operating within this framework since 1960.

The Curriculum. Objectives: The obvious starting point for developing a curriculum was to first review the objectives applicable to the development of future Air Force officers. In subscribing to the dictum of the Roman poet Juvenal, *mens sana in corpore sano* (a sound mind in a sound body), the Service Academy Board visualized that a physical education program for the Air Force Academy should help develop and maintain adequate physical condition, teach athletic skills which could be utilized after graduation, provide experiences that would develop the character and personality of individuals trained, develop through athletics the moral and character qualities necessary for a successful officer, and finally train prospective officers in methods of organizing, supervising, and carrying out an adequate physical education program for his unit after entering active service.²

Instruction and Intramural Programs: Using these objectives as guidance, basic cadet training, physical education, intramural sports, and physical fitness testing programs were established. The physical education curriculum was divided into the basic areas of combatives, aquatics, physical development, and lifetime sports. Although the variety and depth of the activities offered have changed over the years, the basic

²Department of Physical Education Briefing, 1976.

four categories have remained consistent since the original curriculum was taught as a twelve semester hour program. Today, the Physical Education Department awards fourteen semester hours of credit over a four year period and requires that all cadets receive forty hours of activity instruction per year. It is also mandatory that cadets participate in either intramurals or intercollegiates. Since 1955, the Physical Education Department at the U. S. Air Force Academy has grown into one of the most comprehensive, demanding, and rewarding programs of its kind in the nation.

Growth and Improvement: The growth and improvement of these programs did not come easily due to a constant demand for cadet time by all three mission elements. In allocating cadet time for various programs, there was considerable discussion about professional education versus academic education and how should the two be used most effectively at an institution like the Air Force Academy where the overall mission was of a professional nature. With the growth of cooperation among the three mission elements, equitable emphasis was placed on academics, military training, and athletics. As this philosophy was developed and practiced, duplication of subject matter was avoided and many positive changes to Athletic Department programs took place. Specifically, basic cadet training was conducted in a positive manner rather than using exercise as a form of harassment. The value of cadet-managed intramural programs as a means of educating prospective officers in methods of organizing, supervising, and carrying out physical education programs (a specific objective stressed by the Service Academy Board) became quite apparent. A strong interest in cadet physical fitness by the Commandant placed emphasis on squadron physical fitness testing, and the problem of excessive weight loss during basic cadet training was eliminated through a conscientious weight control program jointly developed by officers representing the Commandant and Director of Athletics.

Improvements to athletic programs were not limited to cooperation from outside sources. There was also a significant effort on the part of Athletic Department personnel to support internal programs by volunteering for coaching duties, excusing on-season athletes from physical education classes, sharing facilities with intramural sports, and closely monitoring the program for prevention and care of athletic injuries.

The Physical Fitness Test: Some form of physical fitness test has historically been part of the physical education program although the test items themselves have not always been the same. In the original curriculum the test measured physical aptitude rather than a state of fitness. Today, the physical aptitude test is part of the Academy admission process, and the physical fitness test is administered twice yearly to all cadets except seniors and intercollegiate athletes. Seniors are tested on the mile and one-half run to prepare them for the Air Force Aerobics test. Intercollegiate athletes are excused from the one semester of fitness testing while they are on-season engaged in strenuous daily activity. The existing physical fitness test has proven to be a valid measurement of physical condition and therefore has not been changed since 1962. It consists of negotiating five test items in a fifteen minute period with a maximum of three minutes at each station. The test items are the same for men and women but minimum passing scores have been adjusted to compensate for physiological differences.

At the time a Physical Fitness Test is administered, the cadet's height and weight is recorded on his score card so that abnormal weight changes can be easily identified through computer screening.

Integration of Women Cadets: The physical education curriculum for women cadets was organized under the premise that the syllabus for women would parallel the men's program as much as practicable. This principle was adhered to in the curriculum of first, second, and third class cadets and was slightly varied for the fourth class. During the fourth

class year men enroll in wrestling, boxing, swimming, and gymnastics. The women take swimming, gymnastics, fencing, and physical development. Swimming is the only course that is identical in content and grading criteria for both men and women. Although gymnastics is given in a co-educational atmosphere, the course is patterned after actual competitive events designed for men and women. Physical development is taken by the women in lieu of wrestling, and fencing is taken in place of boxing. The primary purpose of the physical development course is to increase the upper body strength and flexibility of the women so that they can function more effectively in strenuous physical activities. Fencing was implemented to expose women cadets to a combative activity requiring aggressiveness, quick reaction, and timing. During the third-, second- and firstclass years all sub-courses are co-educational. There are some classes in which the women's grade is determined by a curve separate from the men. This has allowed for evaluation based for equal amount of effort for both men and women rather than on the total amount of physical strength.

The Athletic Review Committee. In November 1975, the Dean of the Faculty, Brigadier General William Woodyard, wrote a letter to the Director of Athletics questioning the policy of placing a cadet on Academic Probation for deficiencies in physical education programs. General Woodyard recognized that all cadets must meet certain standards of physical prowess and that remedial training should be required for those who fail to do so. However, he did not agree that placing a cadet who fails a physical education program on Academic Probation was an appropriate course of action. As a result, the Athletic Review Committee was established to deal with cadets who are failures, potential failures, or marginal performers in physical education courses. The Athletic Review Committee (ARC) also monitors cadets who have been identified as having a potential weight problem. Cadets failing to progress after meeting the ARC and receiving

individualized instruction are placed on Athletic Probation which basically carries the same privilege restrictions as a cadet on Academic Probation. The Athletic Director can ultimately submit hard-core deficiency cases to the Academy Board for dismissal.

Intercollegiate Athletics

At the start of the Air Force Academy's 25th year, the Academy has one of the most extensive and successful athletic programs of any college or university in the nation.

A program that embraces twenty-eight varsity teams is a far cry from those days in the summer of 1954 when a small group of men was making plans to build a program that would conform with the dictum, *mens sana in corpore sano*.

The guidelines for this program were already well established with a mission set to produce an intercollegiate athletic program that would "inspire pride in Air Force personnel and attract to the Air Force Academy intelligent, aggressive, highly competitive youths who it was believed would make 'outstanding leaders of men.'"³ Not only would this approach develop leaders, but it also would create a high *esprit de corps* among the cadets.

The athletic program was designed with two goals in mind. The first was "to offer to the largest number of cadets the opportunity to participate in the widest range of sports, with skilled leadership and adequate facilities and equipment." The second goal was "to provide for the Wing of Cadets competitive opportunities which would develop qualities of leadership—the will to win, team spirit, morale, sportsmanship, cooperation, mental alertness and physical fitness."⁴

³Department of Athletics History, 27 July 1954 - 12 June 1956.

⁴Ibid.

Program Evolution. A man was needed to put these noble ideas into actuality and on Sept. 8, 1954, Lt. Col. (later Colonel) Robert W. Whitlow was appointed the Academy's first director of athletics. Even before his appointment, Colonel Whitlow had looked into the project and approached it with a great deal of zeal.

After studying the athletic programs at West Point and Annapolis, Colonel Whitlow felt the Air Force Academy should have the following sports: football, basketball, baseball, indoor track, outdoor track, ice hockey, wrestling, soccer, swimming, tennis, gymnastics, golf, rifle, pistol, and skiing.

Cross country and gymnastics were later added to the list; and when the Academy started its athletic program during the 1955-56 school year, all of those sports were represented by teams except indoor track and ice hockey, which did not have proper training facilities until the Cadet Field House was opened in 1968.

When the Academy fielded its first varsity teams during the 1956-57 academic year, there were fifteen teams competing; but the number of varsity teams jumped to 16 during 1959-60 when indoor track was added, although the trackmen were forced by lack of facilities to travel to other schools for competition.

The number of varsity teams stayed at sixteen until 1966-67 when lacrosse was added to the spring sports schedule. After the Cadet Field House opened, ice hockey moved into varsity status, raising the number of varsity sports to eighteen. In 1971, the number stayed at eighteen with the addition of one sport and the dropping of another: water polo was added as a fall varsity sport, but skiing was dropped because of lack of training facilities.

Lack of proper training facilities was always a problem for the skiers, starting at the Lowry Air Force Base site. There was no nearby practice area, so the team used Winter Park, 60 miles to the west, as a practice and meet area. The prac-

tices were limited to weekends, however, because of the distance, except when heavy snow fell on the Academy grounds, allowing some work in cross-country skiing.

One of the key expansions in the athletic program came in 1976 when women were admitted to the Academy for the first time. Intercollegiate athletic teams were established for the women in the following sports: cross country, volleyball, basketball, fencing, gymnastics, indoor track, swimming, tennis, golf, and outdoor track.

All of the teams competed on the varsity level the first year, except golf, which moved in varsity status during the 1978-79 school year.

When establishing the number of intercollegiate sports, Colonel Whitlow felt that football should be the major intercollegiate sport. In setting up the schedule, he felt the Academy should endeavor to secure games with teams where there was "a reasonable expectance of a fair match."⁵ He recommended that from the period 1955 to 1960 the schedule reflected in Table 26-1 be followed.

TABLE 26-1. Recommended Schedule

1955	5 freshmen games only	Colleges in the vicinity of the Academy
1956	7 games against small colleges	Colleges in the vicinity of the Academy
1957	9 games against small colleges and universities	Regional colleges
1958	9 games against middle-size universities	Regional universities
1959	9 games	Same as 1958
1960	9 games normal competition	3 Regional teams 2 Service academies 4 Intersectional teams

⁵Department of Athletics History.

As it turned out, Air Force moved into the major college football picture faster than Colonel Whitlow's projection. Colonel Whitlow was the head coach during the 1955 season when an all-freshmen schedule was played.

That changed the next year when Lawrence "Buck" Shaw, a civilian, took over as head coach. The Falcons started their varsity football competition on Sept. 29, 1956 at San Diego, Calif., against the University of San Diego, which also was playing its first varsity game. The Academy won with surprising ease, 46-0, and was 4-0 by the end of October, a record that failed to impress Shaw.

"Undefeated, untied and untested" was the way the Falcon coach described his team's success.⁶

After the young Falcons played their first game, an amusing but probably apocryphal story was making the rounds. A fourth classman, under "freshman customs" in vogue at the time at the Academy, was not allowed to pass an upper classman without first securing permission. But in the San Diego game, a freshman back, carrying the ball for the first time, was about to run past his interference (in the form of a third classman) and asked, "By your leave, sir?"⁷

The Falcons wound up with a 6-2-1 record that season and received an invitation to play in a post season bowl game—the Refrigerator Bowl—but declined. Air Force also was considered for the Junior Rose Bowl.

It was also during this time that newspapers published accounts of a super league of "big time" colleges to be in operation by 1960. The members of the proposed league would be Army, Navy, Notre Dame, Pittsburgh, Oklahoma, U.C.L.A., Southern California and Air Force. Air Force expressed an interest in the proposal but nothing came of it.

⁶Department of Athletics History.

⁷"Hypoxia," *The Talon*, Dec 56, p. 16.

Air Force got a chance at the start of the 1957 season to find out if it was ready for this type of competition when it unexpectedly accepted an invitation to play U.C.L.A. in Los Angeles on Sept. 20. The Bruins had previously been scheduled to play Florida on that date but because of a flu epidemic, the latter team had to cancel the game.⁸

It was felt the game would give the cadets good experience and that desire and spirit would be in their favor. It took more than that, however, since U.C.L.A. romped to a 47-0 victory.

The next week Air Force went against an opponent more on its own level and defeated another Los Angeles area team, Occidental, 40-6.

Air Force went 3-6-1 for the season and in early 1958 Shaw and the Air Force Academy, by mutual consent, terminated his contract. Ben Martin, formerly head coach at the University of Virginia, was named head coach and it was during his first season that the Falcons moved into the major college football picture in a rather spectacular way.

Air Force opened the 1958 season and gave Martin a successful debut as head coach by beating the University of Detroit, 37-6, in the Motor City. The next game also was in the Midwest against the University of Iowa at Iowa City. The Hawkeyes were the Big Ten champions and the task was indeed formidable.

But to find out what happened in Iowa City let's read a story written by Bob Collins of the *Rocky Mountain News*, one of the most famous sports stories ever written in the state of Colorado:

"October 4, 1958. That's the date the Air Force Academy came of age. It's the day the Falcons met the challenge of athletic greatness and passed with flying colors. The yardstick was applied by the touted Iowa Hawkeyes,

⁸"Out of the West," *Sports Illustrated*, Sept. 20, 1957.

proud standard bearers of the greatest football conference of them all—the Big Ten. The score was 13-13 and the result transcends sports in its effects on the Academy. All sports tradition at the Academy now starts with this game. No matter what happens to the rest of the season or in seasons to come, they'll still go back to this game in Iowa City when the AFA made its mark in the face of great odds.”⁹

The Academy continued to an undefeated season in 1958, culminating in an invitation to the Cotton Bowl in Dallas where they played to a scoreless tie with Texas Christian University.

Although a tie, that game put Air Force on the football map, but something was still missing and it was a big something—a stadium.

Since the Academy in its early years was located in Denver, the stadium at the University of Denver was used for most Air Force home games. However, in order to give the Falcons more exposure throughout the state other sites were used for “home” games.

In 1955, the Falcons played at Penrose Stadium in Colorado Springs and in Pueblo Stadium. They again played a game in Pueblo Stadium in 1956 and in 1958 played at Washburn Field in Colorado Springs. In 1959, the Falcons played one of their “home” games at Folsom Field in Boulder.

All of this moving around came to halt, however, when Falcon Stadium opened in 1962, giving the Falcons the last major item of a major college football program.

By 1958, Air Force had reached its goal of playing an intersectional major college schedule, one that would bring the proper recognition to the newest of the service academies. But there was still one item missing—competition against Army and Navy.

⁹*Rocky Mountain News*, Oct. 5, 1958.

Col. George B. Simler was athletic director in 1958 when the Academy tried to schedule West Point on a home and home basis. The Superintendent particularly favored this arrangement since it would enable the students from the service academies to witness the first game between the two schools. The Military Academy, however, was reluctant to play in Denver and so was the Naval Academy. It was proposed, however, that Air Force play Army and Navy on alternate years either in the East or some suitable location in the Midwest.

In light of this attitude, the Superintendent of the Air Force Academy instructed the Director of Athletics to carry on negotiations for scheduling the other service academies in alternate years.

"I believe this is a poor substitute," said the Air Force Academy Superintendent, "but the only one possible under the circumstances."¹⁰

Competition started with Army in 1959 when the Black Knights and Air Force met in Yankee Stadium in New York City before a crowd of 67,000 with the game ending in a 13-13 deadlock.

The next year Air Force met Navy for the first time with the Middies prevailing by a 35-3 score at Baltimore's Memorial Stadium.

There was a break in the interservice series, and it was not resumed until 1963 when Army beat the Falcons 14-10 at Chicago's Soldier Field. The same two teams again met at Soldier Field in 1965 with Air Force winning 14-3.

The first interservice game at Falcon Stadium came in 1966 when the Falcons scored a 15-7 triumph over Navy while Army made its first appearance at Falcon Stadium in 1967, scoring a 10-7 victory.

Air Force played at Army's Michie Stadium for the first

¹⁰Ltrs., Supt USAFA to Supts, USMA and USNA, July 22, 1958 (DA-6).

time in 1969, coming away with a 13-6 victory, while the first time the Falcons played at Annapolis was in 1973, losing 42-6.

An annual interservice rivalry among Air Force, Army, and Navy, a long-time dream of most Air Force rooters, finally came into being during the 1972 season with a Commander in Chief's Trophy, sponsored by the alumni associations of the three academies, established to go to the team with the best record in the three-game series.

Since those days in the 1950s when the Air Force Academy was struggling for its athletic identity much has happened, such as numerous All-American cadets and undefeated teams. Nothing can replace them, however, and the policies and achievements established during that early period are still very much in evidence today.

Athletic Facilities—1954-1978

The early days at Lowry Air Force Base. In tracing the history and organization of athletic programs at the Air Force Academy it became quite apparent that they were greatly influenced and sometimes limited by the development and expansion of athletic facilities. During the early days in Denver the big problem was lack of facilities and, as a result, there were conflicts in scheduling between physical training and the Department of Intercollegiate Athletics. To bring the temporary facilities at Lowry Air Force Base into a usable state, the Department of Athletics personnel did the cleaning and refurbishing. To augment the work force, they used military prisoners but had to restrict their use to the second floor of the barracks being renovated because of the lack of adequate guards. Even with that precaution there were incidents of prisoners jumping out of second story windows and escaping.¹¹

¹¹ Personal Interview, Mr. Cuerrero, Falcon Stadium Manager, 19-20 April 1979.

Once administrative offices were complete, additional problems crept up when the staff attempted to procure playing fields for the various athletic teams. At one of the first football games, Air Force was playing the Denver University freshman at DU Stadium. About one minute prior to kick off, it was discovered that the chain link fence in front of the cadet seating area had not been removed as requested. So, after the traditional march on, Department of Athletics personnel rushed to the fence with wire cutters in hand and removed a section so the cadet Wing could enter their seating area from the playing field.¹² Various other football fields were used throughout the state when the Academy was located at Lowry AFB. One such site was the Penrose Rodeo Stadium in Colorado Springs. Since this stadium was primarily for rodeos, there was no grass so the Athletic Department personnel sodded the entire football field and then removed the sod after the game. The goal posts for this game were borrowed from Fort Carson.¹³ To protect the football field from snow, plastic panels were laid across the playing surface and then large groups of people would use the plastic to roll the snow off the field. On several occasions, the Superintendent, General Harmon, and head football coach, Buck Shaw, took part in the snow removal detail. It was ultimately discovered that with moderately large amounts of snow (2 - 3 inches) the panels could not be rolled, so this practice was discontinued.

The move to Colorado Springs—1958. When the Academy was moved to its present location in 1958, many physical education classes were held in Vandenberg Hall since the Cadet Gymnasium was still under construction. The field-house had not even been considered at the time the gymnasium was built, but as additional sports were added, it

¹²Ibid.

¹³Ibid.

became clear that an indoor track, basketball arena, hockey rink, and indoor football practice facility were needed. It was at this point that the fieldhouse concept was developed. Ten years after the first class moved to their permanent location from Lowry AFB, the Air Force Academy opened its last major athletic facility, the yet-to-be-named fieldhouse.

Falcon Stadium. Even after moving to the permanent site in Colorado Springs, the Academy continued to play its football games in Denver. Equipment, bleachers, and many other items had to be transported from the Air Force Academy to Denver and back. Some thought was given by the City of Denver to building a stadium for the Air Force Academy, with possible future use by a Denver professional team. However, the idea was rejected by Academy personnel due to the \$40,000 annual cost of transporting cadets and equipment to and from Denver.

Falcon Stadium was originally sited close to the cadet dormitory area (below Sijan Hall) so that cadets would be close enough to march to the games. However, this location presented parking problems and was subsequently rejected. The present site was selected because it had good terrain, adequate drainage, required minimum storm sewers and its natural bowl allowed eighty percent of the seats to be poured, without further excavation, there greatly reducing construction costs. Artificial turf was considered for the playing field but Coach Ben Martin did not want an experimental stadium. The final result was a natural turf field built with donated funds and completed in 1962.

The first game played in Falcon Stadium was against Colorado State University in the fall of 1962. The day had been proclaimed "Colorado Day" by the Governor and a barbecue for 5,000 people was held in the parking lot prior to the game. It was originally planned for these people to stay for the game; but about the time that the crowd started to arrive for the game, the people at the barbecue decided they wanted to tour the Academy facilities. The ultimate

result was the largest traffic jam in the history of Colorado with cars backed up to Pueblo on the south and Castle Rock on the north. To compound problems that day, the stadium contractor did not flush water lines into the restrooms and the heavy usage during the afternoon caused sand and debris to back up, flooding all restrooms with about four inches of water. The day ended on a high note, however, with Air Force defeating Colorado State 34-0.

Other Athletic Facilities. The Athletic Department has managed a variety of athletic facilities over the years. Most have prospered and grown into major programs, others have not. Two facilities that did not meet the success were a ski slope and a riding stable. The ski slope (1960-1963) was located on Interior Drive but was too difficult to maintain due to rocks and the lack of snow. The stables were originally part of the Athletic Department facilities, and they also proved too costly to maintain and were eventually turned over to the base Special Services Division. Night baseball was also in the original plans for the Air Force Academy until a typical Academy wind leveled the light poles which were not erected again.¹⁴

Today, after twenty-five years of trial and error, the athletic facilities at the U. S. Air Force Academy consist of approximately 143 acres encompassing a 400 meter track, three gymnasiums, 33 tennis courts, two multi-purpose swimming pools, 24 squash courts, 19 handball courts, 24 volleyball courts, two baseball diamonds, a multitude of intramural multi-purpose fields, an indoor 1/6 mile track/multi-purpose area, 6,600 seat basketball arena, and a 3,200 seat ice hockey rink. There are also two eighteen hole, par 72, golf courses and a 47,000 seat football stadium. Visiting

¹⁴Personal Interview, Colonel Frank Merritt, former Director of Athletics, 23 April 1979.

physical educators have said that Air Force Academy facilities are unequaled by an institution of comparable size.

General Philosophy

The total athletic program as described was designed to challenge cadets to achieve various skill levels while developing in the cadet a healthy lifestyle he should continue to practice after graduation. The two main areas of concern involved the biophysical values of muscular activity and the professional values of a military officer. In the biophysical values of muscular activity the primary concern was with physical fitness and emotional stability. The type of physical fitness stressed in many cadet athletic programs involved muscular strength, muscular endurance, and cardiorespiratory endurance. In the programs shown above, an attempt was made to educate cadets toward the values of assessing, developing, and maintaining a high degree of physical fitness throughout their lifetime. The physical activities in which a cadet is required to participate helps the body to adapt internally to physical stresses. The internal adaptation consists of a desirable blend of lean, fat, and bone tissues which control body weight. This ability to adapt to stress becomes increasingly important as one grows older because the degree of fitness is an important factor in prevention of bodily injury and in the time needed to recover from injury.

The second biophysical value area was the cadets' emotional stability. They must be made aware that "there is malnutrition of the spirit as of the body, and man's fitness may rise or fall with his emotional balance" (Sir Adolphe Abrahams).¹⁵ In the U. S. Air Force Academy Physical Education program, emphasis was placed on how to relax and release tension as well as how to meet challenges and stressful situations. As Sir Adolphe Abrahams indicated, participation

¹⁵ Department Physical Education Briefing, 1976.

in muscular activity promotes a desirable emotional release and channels aggressive tendencies into appropriate outlets. An informal environment is conducive to "letting off steam" and thus release of tension and stress. Consequently, all physical education classes are conducted in a relatively relaxed atmosphere with formality taking place only during the reporting and dismissal segments.

The motor skills which are taught in the physical education curriculum allow lifetime sports to be learned in addition to developing confidence needed in survival situations that may come in combat. The physical education area of concern is directed toward the professional values of a military officer. Leadership involves inspiration, character development, and acquisition of desirable human relations qualities. The will-to-win concept must be fostered at all levels. Being second best in a war is unacceptable; consequently, the control and management of violence is by necessity a requirement of every military officer. Athletic participation involves understanding and accepting rules and regulations which govern sports. Officials enforce these guidelines and each participant is expected to demonstrate a certain degree of sportsmanship which is within the spirit of the rules.

The intramural and intercollegiate programs provide cadets with opportunities to lead in a stressful but wholesome environment. These stressful situations aid in the development of courage, stamina, and teamwork; and in the words of General Douglas MacArthur, "Transfer from the fields of friendly strife to the battle fields of tomorrow." The Spartan qualities of sacrifice, self-denial, loyalty, and pride are indispensable aspects of sport participation and training. Team goals or institutional identity supersede individual performance goals and are a worthwhile lesson for all professional military officers.

The last leadership skill which must be developed by a military officer is the ability to make difficult decisions in

crucial situations. The sports environment, although not completely analogous to a combat environment, does lend itself to similar conditions found in combat:

1. Limited time available to make decisions.
2. Specific assets available to do the job (strength, skill, manpower).
3. Specific objectives to be accomplished (to win).

Thus, the intramural and intercollegiate sports programs are considered to be very valuable assets in developing a cadet's leadership qualities. A personal interview with Captain Steve Ritchie (Class of 1964 and Southeast Asia war ace) clearly substantiates these claims. He was asked to what he could attribute his success in the combat flying environment. He replied that due to the limited time available in jet aircraft maneuverability, he felt his training as a defensive halfback on the Air Force Academy football team helped prepare him to make split decisions. He drew the analogy that a defensive halfback has very little time available to determine whether to come up for a run or stay back for pass defense. He found similar conditions in aerial combat over Southeast Asia.

Future Aspirations For The Athletic Department

Future expansion of intercollegiate programs and facilities will be greatly dependent upon the increased availability of funding (appropriated and non-appropriated). Appropriated funds are currently provided in support of the physical education instructional and intramural programs and certain intercollegiate teams (non-revenue producing). Additionally significant monetary support is provided to the overall athletic program in the form of non-appropriated funds generated by the Athletic Association (a non-appropriated funded instrumentality). The primary sources of these funds are intercollegiate football revenue (i.e., ticket sales, television,

concessions) and the Air Force Academy Gift Shop. Other monetary producing activities are also under consideration through promotional efforts. As funds become available, all athletic teams will be permitted to expand their traveling schedule, thereby giving all sports increased exposure on the national level. In addition to expanding existing schedules, new teams will be added to the program, especially in women's athletics.

As for the intramural and instructional programs, they will continue to be comprehensive, demanding, rewarding, and flexible. Re-evaluation will be accomplished on a yearly basis with strong emphasis placed on the needs and desires of cadets, while striving to meet all previously established objectives. Significant curriculum changes in the future might result in a greater demand placed on remedial swimmers so that all cadets will be capable of passing minimum requirements by the end of their fourthclass year. The existing "Physical Fitness Methods" course will be revised to allow lessons on the techniques of distance running. As it becomes justified by cadet interest, a racquetball club and Wing Open Championship will be organized comparable to existing programs offered in squash and handball.

The Department will continue to strive for improvement and standardization of the Physical Aptitude Examination. Additionally, a weight control program has been developed which will establish the ideal weight for each cadet based on his or her body type and bone structure. The program will also identify overweight or underweight cadets and provide them with assistance on how to stay within their recommended limitations.

In summary, the curriculum will remain in favor of co-educational classes, and the required level of physical effort in all programs will continue to be the same for men and women.

ACADEMIC SUPPORT

Directorate of Curriculum and Scheduling Services

CHAPTER 26

ACADEMIC COUNSELING AND SCHEDULING AT THE AIR FORCE ACADEMY*

Counseling

The mission of the Air Force Academy is to graduate young men and women who will provide the nation with a framework of dedicated and capable career officers. It should be evident from this statement that counseling is directly related to the mission of the Academy in preparing cadets to become Air Force officers. In fact, the requirement for counseling is more important at the Air Force Academy than at a civilian university. Freshmen entering the Academy are making a transition from a democratic, civilian environment to a highly regimented military life, placing them under extreme pressure and stress; and the demands of the social system, in many ways a direct contradiction to their previous life styles, cause them to experience feelings of anxiety and insecurity as they face the repeated changes and challenges.

Over the years academic counseling at the Academy has evolved into a totally cadet-oriented program, a program designed to help cadets realize their maximum potential while pursuing academic excellence. The Directorate of Curriculum and Scheduling Services (DFSCS) administers the academic counseling system and monitors the progress of academically deficient cadets. Over 300 officers in various academic departments provide inputs to the counseling

*Written by Lt Col Jackie L. Anderson, Director, Curriculum and Scheduling and Major George H. Wayne, Academic Affairs Staff Officer.

system as well as serve as advisors and counselors to cadets who are seeking guidance in the selection of core courses and majors, or who are academically deficient and have been placed on academic probation. The academic counseling system can best be described as both continuous and comprehensive. It is probably unique in undergraduate institutions of higher learning.

The heart of the academic counseling system is the Academy Class Committees. There are four Class Committees, one for each cadet class level (freshman, sophomore, junior, and senior). Each committee is composed of two continuing members (a member assigned to a particular class until it graduates) and a large number of annual members, appointed by the Dean of the Faculty, the Commandant of Cadets, the Director of Athletics, and the Command Surgeon. Also, each division or department responsible for a major selects faculty advisors as representatives on the junior and senior Class Committees. These representatives act *pro tem* as a member of the Class Committee. Each member of the committees (both continuing and annual) has one vote on all formal motions brought before the Committee.

Class Committees meet at the direction of the Academy Board or at the direction of its Chairman. They usually meet to determine the disposition of cadets who are deficient in studies at a progress report (midsemester) or at the end of a semester. Cadets are deficient when they have a grade of "F" or "I" (Incomplete) in one or more courses, or a cumulative or semester grade point average (GPA) of less than 2.00, or a major's GPA of less than 2.00 in their senior year.

Following the publication of grades at the end of any grading cycle, the Class Committee convenes to interview and counsel cadets who are deficient in studies. Cadets whose overall performance indicates a probability of successful graduation may be recommended for retention. The responsibility of the institution, in such an instance, is to help the cadet meet the minimum standards required for graduation.

Counseling becomes a key in this responsibility, and counseling of all deficient cadets is accomplished each grading cycle. This counseling is done either by one of the four Class Committees or by individuals designated by a Class Committee. For example, in the case of the Class Committee, deficient cadets who have been retained are counseled regarding the Academy Board's directive to repeat or trail specific courses, underload, change academic majors, attend summer school, receive extra instruction, or to enroll in a "How-to-Study" program.

Class Committees also have the responsibility for identifying and placing cadets on academic probation. Cadets placed on academic probation are automatically assigned one Weekend Academic Call to Quarters (WACQ) each week for the duration of the probation period. WACQs are weekend study periods of one hour and 30 minutes duration and are assigned to cadets to be used to improve their academic performance. Class Committees may assign additional WACQs up to a maximum total of 12 per week or assign other requirements as appropriate.

While personnel assigned to DFSCS and Class Committees are continuously involved in the counseling process, the bulk of counseling is done by officers assigned to the faculty serving in positions as Squadron Faculty Officers (SFOs), advisors, and instructors. Curriculum and Scheduling Services administers the process and serves as a single point of contact.

The SFO is a member of the teaching faculty who has volunteered to serve in a squadron as an advisor for the cadets who have not yet declared their majors. One officer is assigned to each of the forty squadrons. The SFO has a variety of responsibilities to include the following: assisting cadets in selection of their major by referring them to the appropriate major advisor, counseling cadets who are experiencing academic problems, assisting cadets in registration for the next semester, informing cadets of special programs or agencies designed to help with a particular problem, and working

with the cadet squadron academic officer on the squadron academic program. SFOs normally attend squadron meetings and cadet social functions, and are, therefore, highly visible to the cadets. Cadets who have not declared a major are required to meet with their SFO at least once a semester. Additionally, after each progress report is published, SFOs counsel any cadet who has multiple Fs or a semester GPA of 1.50 or below. An SFO's inputs to Committees or Boards are highly desirable and are used to make sensitive decisions.

An Advisor-in-Charge(AIC) is responsible for the advising of all cadets within one major. The AIC supervises a number of advisors who counsel cadets on course changes and academic problems. However, the AIC makes the final decisions in administering the major. The AIC also coordinates with the appropriate Class Committee secretary to provide advisor inputs for Class Committee/Academy Board deliberations. Advisors perform essentially the same functions as the SFO for cadets who have declared a major. Advisors see each advisee at least once a semester to discuss registration. Additionally, after each progress report is published, they counsel any cadet who has multiple "Fs" or a semester GPA below 1.50. Advisors and AICs are accessible to cadets any time they are not teaching.

In addition to other counseling sources, all instructors counsel cadets whose classroom performance is below standard. At each progress report, instructors counsel all cadets who receive a "D" or an "F" grade in the courses they teach. During the semester, an instructor may counsel any cadet at any time, and many instructors will interview all of their students at least once. Once a cadet is counseled (by the instructor) for substandard performance, the Air Officer Commanding (AOC) is notified in writing. Cadets are informed of counseling procedures at the beginning of each semester.

Scheduling

The counseling function and activity of DFSCS is a direct product of the many other functions and responsibilities of this office. It serves the Dean of the Faculty in a registrar capacity in that registration, classroom and course scheduling, grading, and final examination scheduling are also all under the purview of DFSCS.

Those functions are performed through data entry and retrieval interfaces with a data base known as the Cadet Administrative Information Data System (CAIDS) and known locally as Cadet AIDS. Currently, the data base has over 700 computer programs which serve to enter data into or extract data from the data base. For example, the course and classroom scheduling systems consist of over 60 programs which use semester course registrations to schedule some 4,500 cadets into approximately 300 courses every semester.

The routine cycle would generally follow this outline:

- a. By using the results of initial placement examinations in mathematics, chemistry, a foreign language, and English plus entrance scores (SAT or ACT), entering fourth-class cadets are placed into the Academy's core curriculum in one of twenty-five different possible tracks. This effectively tailors the beginning curriculum to the entering cadet's capabilities and background (high school only versus some prior college). All entering cadets are now placed into the entire four-year core curriculum and an eight semester plan is published for use by the cadets and their SFOs or majors' advisors. What remains then is for the cadets to choose a major and let their advisors fill in future semester course loads with courses required by the chosen major and with optional courses.

- b. As mentioned earlier, all cadets are required to meet with their advisors at least once each semester to review the upcoming semester's academic plan and to make

appropriate changes. Those meetings are our registration period. There are no registration lines since all cadets are already preregistered and all inputs during the registration period are merely changes to that which has already been done. This method is called a "continuous registration" since any cadet or advisor can make a change to any future semester up to a certain cut-off date of the current semester. Once that date has passed and all registration changes have been entered into the data base and verified, the next semester's scheduling cycle begins by a "toggle" operation. The toggle is placed up or down, and the next semester becomes the current semester.

c. The scheduling cycle begins with several products which are distributed to the various departments. The departments can then use the data for planning their activity in the way of enrollments, numbers of sections, section sizes, teaching loads and assignments, and offering times. Some adjustments are made to accommodate manning and facility constraints and to optimize resources. The final scheduling process can thus begin; it culminates in printed schedules being distributed to all cadets, and section and course rosters and worksheets being distributed to individual instructors.

The grading function is a continuing one through the semester. Departments routinely submit grades after some evaluation device has been administered in their respective courses. Several grading options are currently available such as cumulative scoring, T-scoring, or direct letter grade input. Course administrators choose an option which best suits their needs or course syllabi. Twice each semester, at the midterm progress report and at the end of each semester, grade reports are published which are distributed to SFOs, advisors, coaches, and the Air Officers Commanding (AOCs) of each cadet squadron. The various Class Committee agendas are simultaneously published and distributed and the entire academic advising system with its accompanying deficient

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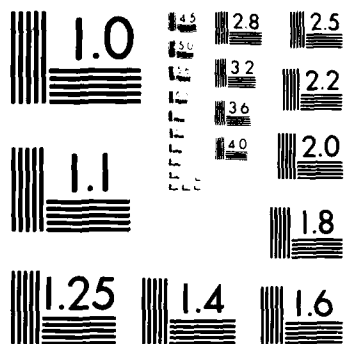
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cadet review system is generated. The functions of the office are therefore linked in a direct way to almost all the advising systems.

Future Considerations

With the recent acquisition of a high speed optical scanning device with a minicomputer attached, our data entry function should improve to the point of almost "real time." Delays in test reports and diagnostics to instructors should become a thing of the past.

Inputs to accountability, schedules, and admissions will also improve our ability to capture useful timely data and will, therefore, improve these systems as well. Serious efforts are currently underway to redesign the Cadet Data Base to take advantage of the state-of-the-art Data Based Management Systems for retrievals and information about cadets, and to make the data base more of a Management Information System (MIS). These improvements will assist us in tracing specially identified cadets and (for all cadets) will aid in the early identification of those whose performance is declining. All these improvements should be possible in the military as well as the academic areas. Connected to this capability, we visualize a word-processing capability that not only notifies cadets of counseling requirements and Class Committee, Academy Board actions, but also notifies advisors and other concerned parties about cadet performance at other than routine grading periods.

Finally, we feel it imperative that a better feedback loop exist between our academic and advising systems and our admissions systems. As a former Dean of the Academy has said, "We have many measures of IQ, but no one has successfully measured I will." We envision more and better research studies which will act to lessen attrition and to better assist the selection and admissions process. Increased capabilities and services provided by this office via an expanded and improved data entry function, data based management and

retrieval systems, and timely management information delivered to mission element managers should all serve as a means to further these goals.

CHAPTER 27

FROM TRAINING AIDS TO VIDEOTAPE: 25 YEARS OF DEVELOPMENT IN AUDIO-VISUAL AIDS AT USAF ACADEMY*

During the planning of the academic program at the USAF Academy, the first superintendent recognized the need for an agency to produce a variety of "training aids." The first step toward this goal was research to "take cognizance of all facilities, public and private, available to us for our future needs."¹

In February 1955, Lieutenant Colonel Virgil J. O'Connor arrived at the Academy to establish and operate an audio-visual service for the faculty. In a year he had developed a limited film and training aids service offering materials loaned or rented from governmental and commercial organizations.

Captain Norman E. Oram took over as Director of Audio-Visual Services under the Dean of the Faculty in January 1956. The directorate then consisted of only eight people operating out of one-and-a-half rooms.

Captain Oram quickly expanded audio-visual support to *all* activities at the Academy. He organized the directorate into three divisions: the Branch Film Exchange, a Graphics Division, and a Training Devices Division. Because of the designation "branch" film exchange, the directorate was able to get films from the Air Force Film Exchange Service, keep

*Written by Alice A. Falmadge, script writer.

¹U. S. Department of Defense, USAF Academy, *History of the United States Air Force Academy FY 27 July 1954 - 12 June 1956*, vol. 1, p. 555. Special Collections Branch, USAF Academy Library, USAF Academy, CO.

them permanently and also lend them out to authorized military and civilian activities. On the other hand, a "base" film exchange has to periodically return films.

Captain Oram faced a more difficult problem than simply organizing the fledgling audio-visual branch. He had to convince a skeptical faculty as to the real value of a viable audio-visual service. The majority of the faculty resisted the use of instructional technology. To encourage instructors to use the directorate, Captain Oram began an in-service training program in the use of audio-visual techniques and media. Captain Oram said:

. . . Not only audio-visual but educational philosophy and psychology should be reemphasized to these people . . . you can improve an instructor by introducing him to a lot of instructional materials with which he can improve himself.²

Captain Oram commented earlier:

There is a wide variation in the use of training aids. We find some people are sold on them, while others are so stubborn that they refuse to use any . . . We have at least one department where they still will not recognize the value of audio-visual media, although they use a lot of things which are training aids. . . . Some instructors are wild about training aids others resent the implication that anything could improve their teaching.³

One of Captain Oram's tasks as director was to plan and program for a consolidated audiovisual facility at the perma-

²U. S. Department of Defense, USAF Academy, "Record of Interview of Captain Norman E. Oram by Air Force Academy Historian at Headquarters, United States Air Force Academy on 12 February 1957," 12 Feb 1957, p. 14. RG 347.1-DI-IT, Special Collections Branch, USAF Academy Library, USAF Academy, CO

³Ibid

nent site and give the physical requirements to the architects so they could provide the proper facilities.

Plans for a television system took the most research. Captain Oram worked with Lieutenant Colonel Ivan M. Friedman, Director of Communications, on the design. Since they did not have the time to determine exactly how television would be used, they decided on a system which would have maximum flexibility and which could cover the entire Academy.

After designing the system for the permanent site, Captain Oram and Lieutenant Colonel Friedman decided they should run a test at the interim site using television equipment already available in the Air Force. They proposed installation of two cameras in a chemistry classroom and a physics classroom with remote operation of the cameras from a control room in the basement. After several months of interviews and meetings, the Chief of Staff vetoed this proposal because of cost. Commenting on the rejection, Captain Oram said:

One of the underlying objections, in my opinion, of most people to closed-circuit television is that they regard it as a threat to their standing or to their reputation as teachers. This feeling is really fostered by studies recently made to combat the teacher shortage.⁴

In November 1956, another *ad hoc* committee was established by the Dean of the Faculty to re-investigate the feasibility of testing closed-circuit television at the interim site. This time the proposal was approved. However, before the plan was implemented, one of the committee members conferred with civilian educators who advised him against trying television at the interim site. This member then got the other committee members to change their recommendations.

⁴Ibid., p. 8.

The Dean of the Faculty subsequently decided not to include closed-circuit television at the interim site, but to try it on a limited scale the first year at the permanent site.

The following two years the Directorate researched films available from other than Air Force sources and procured equipment for still, motion picture, and sound presentations. It expanded its support beyond the cadet academic and air-manship programs to include civilian personnel, the chaplain's office, and others.

During the 60-mile move from Lowry Air Force Base to the permanent site on September 1, 1958, the Directorate provided uninterrupted service.

By 1962 the Directorate had dramatically expanded its personnel and equipment in the new location at Fairchild Hall while its organizational structure remained the same.

The Training Devices Division consisted of a carpenter shop, welding shop, plastics shop, paint shop, and heavy machine shop. This division built training devices for all the departments, including a model of the London Globe Theatre for the Department of English and special displays for the Cadet Registrar. Basically, it constructed items that could be produced for less cost, time, and trouble than going to the civilian market. Another advantage was that the customer could talk directly to manufacturer.

The largest of the divisions was the Graphics Division with approximately 20 employees. It consisted of three branches—Instructional Graphics Branch, Presentational Graphics Branch, and Photo Illustrations Branch. The Instructional Graphics Branch designed cadet manuals, study guides, and workbooks. The Presentational Graphics Branch prepared charts, vu-graphs, and all types of visual support for Academy publicity and briefings. The Photo Illustrations Branch worked closely with the other two branches especially in the creation of 35mm slide briefing packages. It maintained approximately 3,000 color slides which were used to make up various briefings. Volume photographic requirements still

were met by the base photo lab. At this time, the Graphics Division encouraged the use of 35mm slides over vu-graphs because the slide "is much better quality, less cumbersome, more efficient in operation, and can be carried to distant points by the individuals much easier."⁵

The Branch Film Exchange, like the other divisions, served the entire base, but the primary customer was the faculty. It operated and maintained projection equipment in the Arnold Hall cadet social center and various auditoriums and lecture halls in Fairchild Hall. In addition, the Branch Film Exchange had a variety of audiovisual equipment for temporary issue including 16mm projectors, 35mm slide projectors, overhead vu-graph projectors, tape recorders, film strip projectors, and opaque projectors. A film librarian researched, ordered, and rented films while the exchange maintained approximately 3,000 titles in its film library.

Some of the Directorate's projects involved more than one division. For example, the request to redesign and refurbish the Dean's conference room required personnel from the Graphics Division as well as the Training Devices Division. Commenting on this type of intradivision teamwork, the then current Director, Lieutenant Colonel William C. Flannigan, said:

We find that in various projects calling for a variety of talents in mechanics, carpentry, graphics, photo, etc., we can form a "team" with one person in charge. By giving the "chief" complete control, we obtain excellent results faster and cheaper and provide far more satisfaction to the customer. The project chief is the point of contact with the customer; and thus complaints, queries, requests for changes, etc., are directed to this key individual.⁶

⁵U. S. Department of Defense, USAF Academy, "Directorate of Audio-Visual Services, United States Air Force Academy, Colorado," 1962, p. 3. RG 347-DI:IT, Special Collections Branch, USAF Academy Library, USAF Academy, CO.

⁶Ibid., p. 5.

Some of the Directorate of Audio-Visual Services earlier areas of responsibility were assumed by the Directorate of Instructional Research which was created in 1961. This short-lived directorate, later absorbed by the Directorate of Audio-Visual Services in 1964, was responsible to plan, conduct research, and make recommendations for teaching devices and new instructional techniques, and to administer experimental programs and facilities.

The Directorate of Instructional Research studied programmed instruction with specific applications to remedial instruction. In the spring of 1962, it instituted a remedial program in mathematics and English for Academy appointees whose College Entrance Examination Board scores placed them in the bottom ten percent. It also established two reading improvement courses and later developed a study skills course. These original courses proved so effective they still are given today with some modifications. Now incoming cadets are tested for typing and reading speed and comprehension skills. Those who do not validate minimum skill levels take remedial courses in basic typing and reading improvement.

The first reading improvement courses were taught by closed-circuit television, another experiment of the Directorate of Instructional Research. During the academic year 1961-62, the Directorate had researched the controversial subject of closed-circuit television and examined the Academy curriculum for potential users. In late 1961 it submitted plans to Headquarters Air Force for an elaborate instructional television system on the second floor of Fairchild Hall. At that time Headquarters was examining its policy on educational closed-circuit television, and the Academy plan was put on "hold."

Soon it became apparent that Headquarters would not approve the proposed system because it was too elaborate considering the Academy's lack of previous television experience and because of the added manpower necessary to operate

the system. The Directorate then developed plans for a more limited method of introducing and experimenting with television.

Faculty rigidity against media in the classroom was broached directly through sound research techniques and documentation. Television was shown to be effective, and the arguments against it refuted.

In August 1962, a general purpose classroom was converted to an instructor-centered studio inter-connected to 10 classrooms. Using two black-and-white vidicon cameras and a master control video switcher, an instructor could control the presentation by alternating between a picture of himself and a pickup of visual material on the teaching desk.

With the success of the experimental closed-circuit television system established, the Directorate of Audio-Visual Services took over the management of the system and established the Television Center in 1963. That summer it expanded the system to include a second instructor-centered self-directed classroom studio. The Directorate also added a master control room with film chain capability originating either 16mm films or 35mm slides and a distribution system to 80 classrooms.

In July 1964, the equipment from one of the classroom studios was moved to the stage of Lecture Hall F-1 to make a closed-circuit production studio. This more versatile 40-by-60-foot studio area permitted recording and distribution of standard instructor presentations, panel discussions, interviews, concerts, and dramatic productions. By this time nearly every academic department had used television equipment for a variety of educational programs including remote pickups.

In addition to television, the rest of the Directorate of Instructional Research functions were absorbed by the Directorate of Audio-Visual Services in late 1964 in a new organizational segment called the Associate Director for Instructional Systems. Also, at this time, the Television

Center was incorporated into the Television Division and the Branch Film Library became the Film and Equipment Division. The Directorate programmed for the planned expansion of the cadet wing and developed floor plans for space it was to occupy in the addition to the south end of Fairchild Hall.

While the rest of the Directorate divisions were not experiencing as much extensive structural, equipment, and personnel changes as the Television Division, they were slowly expanding their services to meet the growing audio-visual needs of the Academy.

With greater national-level publicity about the Academy, the Training Devices Division constructed more professional exhibit-type displays. The Graphics Division also was called upon to produce more slide briefings and brochures. One outstanding Graphics project was an award-winning full-color brochure designed for the Cadet Chapel dedication. The Training Devices Division designed and fabricated the "Bring Me Men" aluminum letters and two large plaques to decorate the arch at the foot of the cadet assembly ramp. It also fabricated an interferometer stress analysis machine for a special research project. The Graphics and Training Devices divisions worked together redesigning and refurbishing exhibits at the Academy Visitors Center.

Television continued to play an even more important role in supplementing classroom instruction. The amount of programming increased and the number of hours of motion picture film projected into the classrooms nearly doubled in 1964-65 over the preceding academic year. Consequently, the Film and Equipment Division's film rental budget nearly doubled.

In 1965-66 the Directorate felt the effects of the expansion of the Cadet Wing. Output of many divisions increased by over 100%. For example, the Film and Equipment Division had over 50% more requests for equipment loan by faculty departments and Commandant of Cadet instructional activities. This division also received the Air Force Outstanding Services Award for 1965.

During this productive period several research projects were begun. Research and experimentation was done in the area of multi and superimposed projected images. Also studies were begun to determine the effects of section size and instructional methodology on cadet learning.

One major accomplishment of the Training Devices Division was the trisonic wind tunnel chamber wall modification at a significant savings compared to the commercial cost of such modification.

The Graphics Division assumed responsibility for planning, coordinating and scheduling all printing requirements for the academic, military and athletic faculties; developed a consolidated method for the selection, storage, maintenance and retrieval of 35mm slides; and encouraged the more inexpensive use of vu-graphs and 35mm slides as opposed to flip charts. Two projects which exhibit the unique talents of the Graphics Division were the designs for award-winning floats and the preparation of artwork-produced slides for a 360-degree panorama of Stonehenge for a Planetarium showing. In addition to producing the usual slides and rear projection transparencies for closed-circuit television productions, the Graphics Division also developed polarized light techniques to achieve highly effective rear-projected visuals and constructed three-dimensional models.

Television production again increased in 1965-66 compared to the previous academic year. Over three times as many hours of instructional programs were produced as full-crew productions on the stage while instructor-centered productions in the classroom studio decreased by about 10%. Also distribution of films over the television system increased by over 40%. For the first time, the Television Division produced and broadcast two series of programs for Academy families over a cable-television system. One was a sports program and the other an Office of Information-produced show called "Academy Report." During this period, the Air Force Communication Service assumed responsibility for maintenance of the television equipment.

The following year was a record period for the production of in-house television programs. The Television Division produced two fully-televised courses forty hours of instruction in General Psychology and 60 one-half-hour lessons in basic Spanish. In addition to many routine productions, the Division also videotaped fifteen guest lectures for later playback to classrooms. To handle this rising workload, the Division added two film chains and three videotape recorders and expanded the distribution system from 80 to 200 receiving classrooms.

The Film and Equipment Division designed and installed automatic control systems in all D and H section halls. Each system gave the speaker complete control over auditorium lights and the audio-visual equipment in the projection booth.

A major project of the Graphics Division during 1966 was the design and manufacture of 12,000 filmstrip-record kits promoting opportunities at the five service academies. The Graphics Division produced these kits at a much lower price than the commercial cost, resulting in a cost savings to the Air Force Academy of \$10,000.

In reaction to an Air Force-wide program to cut costs and combine related activities, the Directorate of Audio-Visual Services and the Directorate of Photography merged in July 1967, to form the Directorate of Instructional Technology under the Dean of Faculty. At that time all the divisions except the Photo Division and the Training Devices Division had moved into the newly designed and constructed area on the second floor of the Fairchild Hall extension. Television moved into its new 1800 square-foot production studio while maintaining its master control area behind the former lecture hall studio.

Based on research of multi-projected images started in 1965 by the Research Division, a multi-media concept was introduced in the Commandant of Cadets briefing in fall 1967. The Support Division, formerly the Film and Equipment Division, developed the program. Because of equipment

limitations and costs, the multi-media concept was not developed any further until fall 1978, when the Academy command briefing for V.I.P.s was converted to multi-media, multi-image format using six slide projectors, one 16mm projector, and a programmer.

The Graphics Division workload was constantly increasing with a large number of additional requests from the Comptroller's office. That office required the services of an illustrator two or three days each month. As the requirements increased, the Graphics Division permanently detailed an illustrator to the Comptroller's office.

By 1968 around 90% of the academic departments were using the Television Division facilities. Its videotape library offered about 275 Academy-produced instructional programs.

The Directorate's longest standing director, Lieutenant Colonel Howard B. Hitchens, retired in 1969. In one of his final briefings, he said:

During my tenure, I have seen our program undergo significant growth in terms of the logistics of supporting the communication process here at the Air Force Academy. I leave this institution with one regret—I have seen only a minimal improvement or change in the processes and procedures of instruction. Recently, a professional associate of mine from Western Michigan University visited, observed two classes in action, and made the following comment to me, "Hitch, the instructors here at the Academy haven't changed from the way we were doing the teaching job in the 1930's." I sincerely regret that I must agree with his assessment. It is to the improvement of that process that I have dedicated my efforts here at the Academy. And it is that kind of improvement, in the final analysis, to which the instructional technology program at any institution—and particularly here at the Air Force Academy—should dedicate itself.⁷

⁷Howard B. Hitchens, Lt Col, USAF, "Instructional Technology Briefing," 31 March 1969, p. 30. RG 347.1-DI-IT, Special Collections Branch, USAF Academy Library, USAF Academy, CO.

All of the divisions were established in the new expanded facilities in Fairchild Hall by 1969. Over the next several years the Directorate updated its equipment, improved its services, and placed tighter controls on expendable supplies. The objective became greater production and better quality at less expense. The Directorate also changed its emphasis to offer more support of the instructional missions as opposed to research and public relations activities. These changes were implemented as recommended by an outside evaluation. By 1973 the Directorate was expending over 57% of its total resources toward support of cadet instruction.⁸

As part of the overall effort to improve services, the Photo Division installed improved color processing and slide copying equipment. In 1970 it was designated a Special Mission Photographic Laboratory since it uniquely is capable of providing color photos, motion pictures, metal photos, special effect photography, silk screening, and photography for research projects.

The Graphics Division updated its composing equipment to meet the changing technology, converting to a cold-type strike-on system in 1970 and adding a photo composing system in 1976. Like most of the other divisions, the Graphics Division workload markedly increased with the expansion of the Cadet Wing. To meet the rising number of graphics requests, the division established the Self-help Room, a "do-it-yourself" facility for cadets and staff personnel which offered assistance and supplies so users could quickly produce low-cost professional graphics. This unique production service now averages 1,000 users each month, representing a substantial savings to the Graphics Division since it allows highly skilled illustrators more time to devote to comprehensive graphic requirements.

⁸U. S. Department of Defense, USAF Academy, *History of the United States Air Force Academy FY 1 July 1972 - 30 June 1973*, vol. II, DF-1, section VII, p. 1. Special Collections Branch, USAF Academy Library, USAF Academy, CO.

The Support Division also established a new service, the Media Resource Center. It offered a card catalog listing of all available instructional materials including films, filmstrips, slides (transferred from the Graphics Division), and three-dimensional models. After selecting the materials in the card catalog, the customer could preview them in individual booths equipped with different types of audio-visual projection equipment.

Another response to the Directorate's new management efficiency concept was the establishment of the Production Control/Quality Control Division in 1969, an innovation of the then current Director Lieutenant Colonel Leland C. Endsley. Replacing the intra-division team concept, it functioned as a single point of contact for all work order requests to insure maximum efficiency and economy. This division also offered on-the-spot customer consultation, a final quality control check on all production items, and a controlled cost accounting service for all Directorate clients. Within a year the Directorate realized benefits from this new division not only in cost reduction but also in increased efficiency and product quality.

The result has been a smoother flow of needs and ideas between the customer-requestor and the performing section with the return of a product more exactly tailored to the requestor's needs. Priority systems and realistic request dates have returned higher quality products to the individual and departmental requestors when it was needed.⁹

Another organizational change during this period was the loss of the Research Division in 1969 when it was redesignated a separate directorate under the Dean of Faculty.

⁹U. S. Department of Defense, USAF Academy, *History of the United States Air Force Academy FY 1 July 1970 - 30 June 1971*, vol. III, DF-18-A, section X, p. 11. Special Collections Branch, USAF Academy Library, USAF Academy, CO.

However, the Directorate continued to support outside research projects. In 1972 it completed two programs for the Air Force Human Resources Laboratory, Air Force Systems Command. The first evaluated multi-media applications to counseling and job simulation environment while the second evaluated video cassette television equipment for education and counseling applications.

Because of the increasing demand on the Support Division for audiovisual equipment operators, in 1972 the division added a two-hour course in equipment operations to the new instructor orientation program which had continued since the early days.

The Television Division also was keeping pace with state-of-the-art equipment, converting its operation from black-and-white to color by March 1973. The following year the division acquired 16 video cassette machines, converting the program distribution system to an all-cassette format offering 12-channel color playback capability.

By 1974 over 75% of the Directorate of Instructional Technology resources were expended toward cadet instruction.¹⁰ The four production divisions--Graphics, Photo, Training Devices, and Television--achieved greater efficiency by making use of previously created artwork, master drawings, and other materials.

In 1974-75 the Television Division again improved its facility. It purchased and installed 125 new color monitors, equipping 210 classrooms with color television sets for reception from the distribution system. More recent improvements include a sophisticated production switcher, a time base corrector, and a character generator. In fall 1977, the division added a script writer to its staff, improving the

¹⁰U. S. Department of Defense, USAF Academy, *History of the United States Air Force Academy FY 1 July 1974 - 30 June 1975*, vol. 1, DF-1, p. 1. Special Collections Branch, USAF Academy Library, USAF Academy, CO.

professional quality of its productions while removing the burden of writing from the requestor.

During 1977, the Support Division and the Training Devices Division worked together remodeling the Superintendent's and Commandant of Cadets' conference rooms and changed the projection configuration from front to rear screen.

The final organizational change during the Directorate of Instructional Technology's first 25 years was the integration of the Precision Measurement Equipment Laboratory in 1978. This division is responsible for inspection, calibration, repair and certification of all precision measurement equipment assigned to the academic departments, other Academy organizations and tenant units.

Under its present organization, the Directorate has three support functions--the Production Control/Quality Control Division, the Precision Measurement Equipment Laboratory, and the Audio-Visual Support Division. The Support Division continues to maintain essentially its original function of renting and purchasing films and slides, maintaining and loaning many types of audio-visual materials and equipment.

The four production functions are the Photo Division, the Graphics Division, the Training Devices Division, and the Television Division. The Photo Division exposes, processes and prints all photographic material for the Academy and has been designated as a Special Mission Photographic Laboratory because of the Academy's unique requirements. The Graphics Division offers a complete visual communication service creating graphic art and composing copy for printed materials that include cadet textbooks, slides, displays, motion pictures, and television production. An adjunct service is the Self-help Room. The original "training aids" service developed into the Training Devices Division which produces display and instructional devices required for the laboratory or classroom using metal, plastic and wood products. Since 1962 when television first came to the Academy in the form of two black-and-white vidicon cameras in a converted class-

room, the Television Division has expanded to include an 1800 square-foot studio using state-of-the-art color equipment with distribution over 12 channels via closed-circuit television to 350 teaching areas.

The Directorate also has a teaching mission. The 1961 reading improvement class has developed into two courses in basic typing and reading improvements to assist cadets in meeting academic requirements.

With all its changes and expansions from the early minimal film library and small art shop, the Directorate of Instructional Technology has one abiding problem—to get Academy personnel to recognize the instructional value of audio-visual aids and then use the Directorate's services to assist them in supporting the Academy mission. A continuing method the Directorate uses to attack this problem is orientation of new instructors and staff personnel.

Entering its second twenty-five years, the Directorate of Instructional Technology's teaching, production, and support functions with over 80 staff positions continues to provide highly professional audiovisual services and products that are immediate, economical, and educationally meaningful to the development of cadets as future Air Force leaders.

CHAPTER 28

LIBRARY FACILITY AND SERVICE ADAPTATION: THE FIRST 25 YEARS*

The 25th anniversary for a major educational institution is a significant milestone and is also an excellent time to look back: to reflect on adjustments, to analyze things that happened, and perhaps to reflect upon things that almost happened. Time for reflection at any institution is perhaps too short, and the chance that an anniversary provides to concentrate ought to be savored. A service organization, such as a library, if well led and adaptive, can be an excellent mirror for reflection. Certainly, if service organizations serve their institutions well, they must constantly make adjustments as major functional elements of the parent institution adjust. Therefore, this article about the USAFA Library will describe growth, facilities, and services as well as some "almost" occurrences over the last twenty-five years. It will describe how the library has melded itself to serve the entire Academy. Since there are literally dozens of themes which could be interwoven into such an historical study, this paper will attempt to follow only one theme—service. That service is derived from the constant institutional support which the library has received and tempered by a constant policy of analysis and adjustment.

Since this paper is written on the occasion of the 25th Anniversary, it seems logical that the longer time period

*This chapter was prepared by Lieutenant Colonel Benjamin C. Glidden, Tenure Director of Libraries, and Mr. Donald J. Barrett, Assistant Director of Public Services.

should be divided for purposes of description into smaller time periods. There was a period of approximately five years of initiation in which major planning was done for the Library itself. Service units were originated in a temporary facility at Lowry AFB, a staff was gathered, and many of the long-term practices and procedures were created and tested. When the Academy moved approximately 60 miles to its new location, the library adapted to a new building which was designed only partially to meet the service needs of an academic library. Library operations were subdivided to serve some functional areas which were no longer co-located with the student body. Additionally, there was a discernible period of specializing individual functions as service needs were defined and satisfied. The second major development period can be approximated somewhat by the decade of the 60's. It was a decade of fairly constant growth, consolidation and weeding of extant services, and the adaptation of more effective procedures and practices. But perhaps most importantly, it was a period of monitoring a rapidly developing curriculum. Satisfying the needs of that curriculum development and then readjusting to major program changes stressed flexibility in the service unit.

The present period is the 70's. The 70's for the entire library field have been a time of many new attempts and some stunning successes. Mechanization or computerization of the processing and service areas have been widely adopted across the country. These changes often dictated staff adjustments, new education requirements, training needs, and organization. The library structure itself matured to spatial limits of the original building as the new functional adjustments came. Requirements to modify the original frame were defined to serve an enlarged student body and to accommodate the new technologies. All of these major trends have implications for staff adjustments.

The 25th year finds us at a time of new beginning. Major plans for modifying the entire structure of the building are

in progress. The seeds for that modification were sown in the original plans for the building. With the new structure will come the potential for further adaptation of media resources; computer and mechanical processing; assistance; and, of course, the omnipresent pressure for staff adjustments. But it all began twenty-five years ago.

When the Academy began in 1954, the Library was only a concept. A few lines in the recommendation of the Service Academy Board report of 1950 stated "that the administration of all the libraries at each academy, be centralized under the general direction of the Superintendent, and that all books be cataloged in a central library." A sub-committee of the planning group for the AFA recommended among other things that the Library of Congress cataloging system be used and that facilities "give serious consideration to a greater use of library resources in their instructional procedures."

The first director of the AFA library, Lieutenant Colonel Arthur J. Larsen, arrived at the interim site at Lowry AFB on 18 September 1954. There was only a year, or slightly less than a year, until classes would begin; and there were no library, no staff, and no resources. With that time limitation and a sizable mission to accomplish, expediency and short term planning were required. Library staff positions were filled in order to need. First, the acquisition department was organized so materials could be ordered. Next, the catalog department was assembled in order that materials which were beginning to arrive could be classified and processed for the patrons yet to come. Since the institution began with only a freshman class, the initial purchases were basic reference tools and some books which would assist in teaching classes for that first year. By the spring of 1955, a public service staff began to gather. An initial concept was to have a public service staff which was academically qualified in all the disciplinary areas that the Academy would teach. Therefore, original staffing requests were sent out for people with PhDs in disciplinary areas and with a concept of and experience in

library service. In that period such people were very hard to find. Two or three candidates were gathered, but after a trial period we discovered that the disciplinary degrees were not suitable substitutes for strong public service experience in a library atmosphere. Extreme specialization conflicted with servicing customers with a wide variety of questions. The disciplinary PhDs were not very useful and some of the librarians who had been hired for routine staff positions were far more qualified to handle the public service library functions which quickly developed. There was an immediate adjustment in the hiring pattern. In fact, no more of the disciplinary PhDs were acquired, difficult as they were to obtain; and the hiring emphasis turned to librarians with proven successful experience, with face-to-face public service practice. This emphasis has become a hallmark of the public service staff. While staffing patterns were somewhat in question, there were no reading rooms or stacks available until early August 1955. Installation of that essential furniture at the interim site at Lowry AFB was actually completed on the 14th of August and the next day the Library opened. Its collection totaled approximately 500 volumes and was serviced by a willing and eager staff.

Initial purchases had been selected from standard bibliographies and in coordination with the first faculty members gathered at the interim site. The institution was new; the library facility was new and tiny; yet the questions which came to the reference staff were typically varied and with a small site and sparse resources, they were most challenging. Frequently, a routine reference question response would be, "I know just the book to answer that but we don't own it." And for several years, the lack of basic tools persisted since they were often out of print and the reprint publishing field had not begun to flourish. At this point the ancient cooperative instincts of the library profession multiplied the service potential of the new school immeasurably. The libraries of the area, especially the Denver Public Library and the Univer-

sity of Denver Library, were most gracious in granting extraordinary privileges to the new and growing institution. When faculty members had resource requests which were required for the cadets to write papers, our Academy Library staff was permitted to select and borrow as many as 400 volumes on topics of specific interest for use in the Academy Library by cadets. The books were promptly returned after the initial writing requirements were completed; and, of course, there was a good bit of attention to ensure that materials were closely controlled and returned in good condition. The location services of the Bibliographical Center for Research, still located in Denver, were also heavily used. Since this period predated the heavy use of mechanical and computer equipment for handling bibliographic files, staff members from the Academy Library worked nights and weekends to assist the Bibliographical Center in their enormous filing efforts as somewhat of a *quid pro quo* for the excellent service which the Center offered the new and under-endowed Academy Library.

While classroom teaching during the first year was in progress, buying or acquiring titles for the second-year courses was underway. By the end of the first year when Lieutenant Colonel Larsen retired to be succeeded by Lieutenant Colonel George Fagan, the collection had grown to 20,000 volumes. During this purchase period, the philosophy of acquiring an extensive reference and bibliographic collection was taking shape. This philosophy was an outgrowth of understanding of the then young and fast-learning staff. They perceived that in later years support for many needs of the faculty and cadets would be derived from and dependent on local and regional resources. Succeeding years have shown that the most demanding research ventures and projects at advanced levels of academic involvement need support from great distances. These early perceptions have proven to be essentially true over the longer term. Regional resources fill most of the institution's need. The policy of holding a very

complete reference and bibliographic collection is still being followed, because that collection serves as an essential link in the keenly felt service orientation which shares outside resources.

Not only was the library new, but the whole Academy was new, and the interface of an institution of higher education with generalized Air Force functions brought interesting accommodations. The problems of procuring library materials were most unusual to the fledgling Academy and also to the Air Force system which heretofore had been geared to acquiring military supplies and equipment. The staff was small, but the sense of mission accomplishment was so admirably concentrated that the development of a system of practices and procedures for buying library materials was hammered out through countless coordination and negotiation sessions. Mission concentration and a sense of future needs ensure that those successful practices continued. Indeed, many aspects of the earliest procedures are still in existence and serve with unique effectiveness.

It can be fairly said that the Academy construction was such an enormous venture that design and careful articulation of all aspects of the library were not as carefully planned and laid out as they would have been had the library been the primary project. It occupied only a small portion of Fairchild Hall (the academic building); and, of course, many other buildings in the entire Academy project were being constructed at the same time. Such things as traffic patterns were unknown, and many other key factors could only be vague, educated estimates.

During the second year of teaching at Lowry AFB, it was decided that the class would remain at Lowry for the third year before it moved to the new facilities at the permanent site. This decision meant the tiny library facility was stretched to its maximum service and storage limits. Resources had grown, the number of people had grown, but the facility was essentially the same size. There were dire con-

sequences. It was often necessary to move ten or more full shelves of books in order to add or to replace a single volume to the stacks if a new one arrived or if one that had been checked out for an extended period was returned. When the entire organization began to plan for the actual move to the new and permanent facility, the new library building was still about five months from completion. In effect, then, our clients were moving to the new facility and the public service portion of the library would have to be moved to the new site to serve them. The public service staff was moved to the new site and lodged in temporary quarters in a corridor on the second floor of the academic building. The public service staff had chosen about 10,000 select volumes and the card catalog to accompany this move; meanwhile, the technical services staff remained at Lowry AFB with the rest of the collection of about 60,000 volumes. A daily courier service transported materials required on a daily-request basis. Meanwhile, a most exacting exercise in communication of reference needs took place: writing to a professional staff that never saw a patron. This circumstance lasted for about four months. In December, 1958, the remaining collections from the Lowry site were moved to the permanent site, and the collections were all moved from the corridor area of the academic building into the new facility and reintegrated as a single-service book collection again.

When the library was dedicated in 1959, resources had grown to 80,000 volumes. The library had become a partial resources depository for US government documents in 1956 because there was a high use of these documents in class instruction and inquiry from faculty and cadets. From its very earliest days, benefactors of the Academy had been instrumental in building the foundation of a growing aeronautics and military history collection from gifts of personal resources. Because of interest and identification with the falcon, which is the Academy's mascot, the seeds of a special collection on falconry had also begun to grow in the very

first years. Certain enlightened individuals among the staff immediately began conservation of the Academy's archival heritage, and those materials were housed in the Special Collections Branch. As a reflection of general Air Force policy, a new library to serve base dependents was begun in the spring of 1959. In conjunction with original planning, that library, although managed as a public library outlet, was a distinct part and under direct management of the library system for the entire Academy community.

Because of the close proximity of most operational units, the Academy developed a strong central library. Only small working collections are placed in academic departments and staff agencies to meet frequent daily requirements. This centralized system reflects both the fact that the initial planning documents suggested a strong and centralized library system and the fact that the very first library director worked directly for the Superintendent and, therefore, reflected the concept of centralized management authority. Because of these two happy circumstances, the essential resources which the system owns will always be totally available to cadets, faculty, and staff during the more than ninety hours of the library's operating week.

The library facility provided space for about 300,000 volumes, approximately 1,000 spaces for study and recreational reading users, and was located on three floors at the north end of the academic building. The quality of equipment and lighting can be attested to by its nearly new appearance after twenty years of use. The entire public service area of the library was designed as a completely open stack for maximum patron accessibility to the entire collection.

From the very first semester of operation, the library staff has played an active role in cadet academic life. A continually evolving orientation program was developed for all new cadets. Many cadets had never seen or attempted to use collections of the type and size of those at the Academy.

Members of the reference staff participated in the classroom in all basic English courses and in other academic disciplines as well. After the move to the permanent site, both taped and live, closed-circuit video presentations were added to the library's instructional technique. Librarians became performers and camera operators as well as script writers. A *Library Handbook* was developed and oriented primarily for use by cadets. By the 1970's the *Library Handbook* was supplemented by guides and handouts on specific reference uses. Close liaison with academic departments has led to coordination of cadet writing assignments to be certain that library resources and reference staff were available for peak needs. An experimental program has been conducted with English classes to find still more effective methods in teaching use of reference materials.

The mid-70's produced the first cadet instruction on specific reference uses which are run as self-paced interactive computer programs. They are available within the library as self-taught programs from a computer terminal. These programs allow individual inquiries from patrons seeking to improve skills in the use of specific library tools and research techniques and also to provide a useful extension of the English courses which treat library use.

The 60's were a time of growth and consolidation. Some changes were mandated by statute, but a consolidation of many early service and resource initiatives were an outgrowth of use patterns. Congress passed legislation which required the expansion of the Cadet Wing and which gradually forced expansion of the stack capacity within the Library by 100,000 volumes. This expansion was accomplished by reducing stack aisles from an initial 42 inches to 36 inches and then erecting new ranges of stacks in the recovered area. Modification of seating and chair arrangements to remove some of the larger lounge seats and replacement with more space-efficient seating in study areas were required. A sizable room on the third floor of the academic area was a book-

store; but after the academic building was expanded, the bookstore was moved to another area and the space vacated by the bookstore was made into a study area for nearly 100 students.

The entire library system continued to grow and define itself more specifically. The Library assumed responsibility for the professional medical library and the patients' library, both of which were in the hospital. With this added responsibility, a full-time staff member as assigned in the hospital area, and the original planning parameter which required a complete and centrally managed library system was more nearly realized. Book resources themselves expanded from about 100,000 available in the academic library in 1960 to about 275,000 volumes in 1970. Special resources continue to grow, especially in the aeronautics and Air Force history collections. A major gift of the early 1960s was the personal papers of General Laurence S. Kuter. These papers span his entire military career from 1927 to 1962; and because he was so prominent in the military community, this gift incited a steady flow of military aviation materials from military leaders who have deposited collections with the USAFA Library. These collections are for use by research scholars at the Academy and throughout the country. Through these collections cadets now have access to primary source documents from the earliest days of air service to the present.

Because of a small but steady trickle of special gifts, it was also necessary to formulate policy for selectivity in gift acceptance. An Air Force archives already existed, and the Academy could ill afford the space or the personnel to become a second archives. Therefore, only materials which were closely related to formulation of Academy policy or the construction of facilities were accepted.

A significant gift of money was given to the Academy Library in the name of Dr. Theodore Von Karman to purchase books in areas of his scientific interest. Those funds, which were given on an annual basis for several years, pur-

chased materials which formed the basis of the science collection. In addition, these funds given for a specific purpose constituted the first large monetary gift which required constant monitoring; happily, many similar gifts have followed.

The Library also became an active gatherer of oral history resources from the Academy's oral history program. We also accepted selected oral histories from the Air University historical program and the participating Air Force agencies. This practice provided another unique resource to our patrons. With the curriculum emphasis on science and engineering, the growing importance of report literature was recognized early by the library staff. Arrangements were made with the Defense Documentation Center to have all the unclassified reports automatically deposited here in microfiche format. In addition, the distribution of NASA reports was accepted in the early 1970's, and more than 250,000 microfiche titles are now available to our clients.

In 1969 Major Claude Johns replaced Colonel George Fagan who retired from active duty. The adjustment of services and facilities still continued. The original map room which early patrons preferred was gradually transferred to the Geography Department as that teaching program expanded and the need for a full map facility manned by a map specialist became more evident. This expansion was also during the Vietnam War, and a "current awareness" program was begun with fairly major grant of space and attention in order to keep cadets and staff alert to events in Southeast Asia. Eventually, the strong efforts needed to keep current that room and the lagging interest in the day-to-day war effort spelled the demise of that display area. The displays were dismantled and the space reassigned to Special Collections which was still growing. By the late 60s, it had also become obvious that with the expansion of the Cadet Wing and constant growth of library resources, the Cadet Library facilities would need to be expanded; and statements

to that effect were introduced into the Academy 15-year Planning Document.

The decade of the 70s began with many significant changes for the Library. Most of those changes came from an analysis of internal operations. Since costs continued to rise, all operations were reviewed. Staffing patterns were closely examined with greater emphasis on developing technician positions, replacing military clerical positions with civilian library aids, and eliminating some positions completely. With these staff adjustments, it was apparent that programs of continuing education and self-development needed to be broadened and accelerated. Leading from studies conducted by Ms. Marcy Murphy, the reference staff became much more actively involved with faculty outreach, cadet teaching programs, and collection development responsibilities. The professional staff always had major responsibility for book selection and weeding programs; but with the increased scale of the entire library resources, it became obvious that the chief of acquisitions could no longer be the final authority for the appropriateness of selecting materials. This responsibility was sub-divided among the professionals in reference with the chief of reference acting as coordinator. Outreach to using departments and teaching responsibilities, which were already in the scope of reference librarian duties, complemented the selection of materials. Although a weeding program had begun the first year of operation, as resources grew this process became an increasingly important activity pursued chiefly in the summer. To ease some of the time-consuming inspection of ordering tools, the Academy adopted a new approval plan. Although not a complete selection tool, it provided effective selection and speedy receipt of some common materials without expensive manpower follow-up.

The gift program which was begun with smaller resources in the 60s continued into the 70s with many early contacts and promises coming to fruition. A major resource was

offered to the Academy in May of 1970 from the estate of the recently deceased Colonel Richard Gimbel. Colonel Gimbel had kept up a congenial correspondence with both the Air Force and Colonel George Fagan for several years. He was a grandson of the Gimbel department store founder and a retired Air Force officer. He had been a noted bibliophile. His collections included one in aeronautical history which was internationally known. Its approximately 20,000 items covered almost 5,000 years of man's desire to fly, with heavy concentration in the era of pre-powered flight. The library staff study to the Secretary of the Air Force recommended acceptance of the gift provided a suitable room could be outfitted to house the collection with appropriate material protection was accepted by the Secretary in January of 1971, and the room was built and equipment installed in less than five months.

In the negotiations for the original acceptance of the collection, it was understood that the Air Force had an obligation to contract for approximately 1-1½ years of work to prepare the collection for public use. Work on the cataloging and preparation was begun on a contract basis in July 1971. Since that time, scholars from throughout the world have come to use the resources or have written to gain access to these unique materials. Significant gifts have enhanced the Gimbel resources, and exchange of duplicates with other collectors and the purchases of some resources have enriched the collection. Selections from the collection resources have been loaned to the National Air & Space Museum and other agencies. Distinguished visitors to the Academy normally review these unique resources, and several gifts from this country and abroad have subsequently been received to augment this resource.

As library managers talked with colleagues in the library community around the country and as the impact of automation became more pronounced, a need to plan for expanded facilities and service capabilities was accentuated.

The difficulty of adding new computer facilities in the 1950-era building was obvious. Also, the multi-media needs of cadets and faculty members had become more closely entwined with the use of traditional library materials, and many needs could not be met with the present facility. Staff analyses and comparisons indicated that expanded facilities capable of accepting the new technology of the 1970s needed to be constructed as soon as possible. The instructions which had been put into the 15-year Academy plan were moved into the active planning stage. There were years of interaction with the Air Staff, Base Engineers, and the chain of command at this installation as the conceptual design for the construction was refined and made acceptable to all those who would interact for a successful completion. The actual architectural and engineering design contract was let in May of 1978. After that phase had been completed, it was still necessary to analyze several alternatives for designs with current emphasis for adding about 45,000 sq ft on the terrazzo level to include about 400 badly needed client seats. Room for additional stacks as well as for patron services not now available were included. With skillful and tenacious support from the Academy staff, the Board of Visitors, and several Congressional offices, a \$4 million appropriation was cleared through the Congress and included in the 1979 Military Construction Program.

Planning installation of new technologies continued. The first major program was the installation of the automated circulation control system which became operational in July 1977. The installation of this equipment alone had taken several years of planning, and the data base for a successful operation had been built for over eighteen months before actual equipment for operation was installed. The bar-code, light-pen system is already giving better service to patrons, increased accountability and significant use data for collection development planning.

As the possibility for receiving OCLC service* extended into the Rocky Mountain area, the library analyzed and then elected to adopt this new processing technology. The equipment was actually installed, and training and procedural adjustments began in September 1977. This adaptation proved to be one of those unusual cases where new technology actually eliminated two staff positions because the equipment had eliminated that much routine work. The average book coming into the library can now be fully cataloged and on the shelves less than two weeks after receipt. The third new computer related service technology which arrived in the library was the on-line data base reference bank. It began on a trial basis in July 1978. After close analysis of six months of productivity from this technology, it has been adopted for permanent retention as a reference service. It provides access to over twenty-five million citations in a variety of disciplines. It works through an on-line interaction between the patron and the data base, the reference staff member providing the search strategy and assistance as an intermediary.

Most of the adjustments undertaken by the Academy Library have been impelled, suggested, or analyzed because the Library staff has always been active in regional and national library affairs. Two meetings of the Military Librarians' Workshop have been hosted by the Academy, as well as many local library professional groups. There have constantly been tours, classes, and other interchanges between the Library School at Denver University and the Academy Library staff. Local and regional prominence of the AFA Library itself has caused many tours by attendees at national meetings in the area to visit the Library; these serve to make

**Editors' note:* Ohio College Library Center (originally the name of the non-profit organization which began the computerized cataloging assistance for libraries. The acronym later became the name after the pilot program ended.)

our resources known, as well as to keep our staff abreast of changing professional ideas.

Attendance at professional workshops, participation by staff on panels and committees, and willingness to serve as candidates for national and regional professional offices have characterized our active involvement over the years. One practice in staff selection has been to gather professional librarians from library schools across the country in order that the staff could be a true national representation of the various professional viewpoints in order to staff this truly national library. Mass publications such as the special bibliographic series and the many analytical studies which have preceded adjustments in staff, services and facilities, have drawn comment and emulation throughout the library world. The accomplishments, the adjustments, and the resources could not have been realized without strong continuing support of present and former Academy commanders. Superintendents and Deans have provided the adequate budgets, the encouragement, and the support facilities to analyze and adjust our resources and services to produce a truly strong library to meet the needs of cadets, faculty, and staff.

We, like the library community as a whole, have felt the ravages of inflation. These prime increases have produced sometime distressing reviews of acquisitions programs for books and periodicals. However, the collegial community has been cooperative in both faculty and staff agencies to enable us to trim duplicates from purchase plans, or to borrow rather than buy, specialized publications in order to maintain the most essential services. The acceptance of the place of the library in the educational process has never been questioned, and we look forward to a second-quarter century of service to the Academy, combining the best of our existing services with new and yet undeveloped concepts which will be analyzed, adapted, and then adopted into our new and expanded facility.

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